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INDUSTRIAL-ARTS MAGAZINE

Vol. V JULY, 1916 No. 7

THE PRACTICAL DESIGNER IN THE INDUSTRIES: WHO HE IS AND WHAT HE DOES

Lachlan McLachlan, Head Designer, Berkey & Gay Furniture Co., Grand Rapids, Mich.

I TAKE it that it is accepted by us all that a designer to be successful must above all things be practical. He may have natural talents highly developed thru training and study, but unless he has learned to practically apply his knowledge, the industry to which he is making his appeal would be more prosperous without his suggestions.

It may be possible to get up an argument about his abilities or disabilities, his good taste or his lack of it. Notwithstanding how diverse our opinions may be on these points, I think we will unanimously agree he must be practical. So the designer I am going to talk about is going to be a practical designer and it may even develop after we have studied the sort of man we need that this designer will turn out to be what is called a commercial designer. But notwithstanding the fact he is commercial, we may find not only that he has ideals but that the demonstration of these ideals can be both practical and profitable.

Speaking then, especially as a designer of furniture whose designs are executed exactly as they are drawn, I am going to tell you in particular who the designer of furniture is and what he does.

Even a slight acquaintance with the past will show us that just so soon as our ancestors had the opportunity and inclination to change their places of abode from being their houses into being their homes, the taste for physical comforts became refined and developed and with the refinement of physical comfort, there soon developed a desire for mental comfort or if you prefer the expression, an harmonious condition for the mind and eye as well as for the body.

It has been evident for so long a time we accept it as natural that a man is not content to allow the articles with which he surrounds himself to remain purely utilitarian. He begins sooner, or later, to add grace and refinement of form and color. I think there are few of us who would care to have the work of the designer entirely eliminated from our daily lives and only absolutely utilitarian forms used. Without design, I suppose, we would be clothed not with our present garments but with a piece of colorless cloth fastened on our bodies in some inexplicable manner; we would sit on some cube-like form and eat from dishes which would be, if only utilitarian, rather shapeless receptacles for food.

The fact is, it is difficult to imagine even the commercial world without design. It may be thought that even granting the desirability of design, that surely there has been created a sufficient variety of designs in the past hundred years to meet any conceivable condition and every known taste. As a matter of fact, however, we have no more a sufficiency of design to meet every physical condition than we have a sufficiency of books to express every thought. It is possible there may be a superfluity of both books and chairs, but there is still not only a demand but a necessity for a new expression to meet a new condition.

Our ideas and our ideals are changing, our requirements are increasing and there is a new world being explored, that is the world in which most of us live, the world of the moderate income. It is not so very long ago since the man with the small amount to spend apparently received but little consideration. The individual received individual attention but the tastes of the collective average man were almost completely ignored, while today there is no one into whose minds and pocketbooks we are more anxious to dip.

The average man's demands are numerous and his aesthetic requirements are apparently worth paying attention to.

It is interesting to note how many articles of daily use still await the touch of grace. It may sound affected and ridiculous to talk of associating refinement of design with pots and pans, with coffee mills and baking boards, and yet these very things have in the past expressed as much beauty of form as have cups and saucers, knives and forks, candle sticks and andirons.

That there is a desire to make the form of the household articles less objectionable or more harmonious, is demonstrated in the improvement we see in the designs of such purely utilitarian articles as

This paper was read before the convention of the Western Drawing and Manual Training Association, at Grand Rapids, May 4.

sewing machines and gas stoves. Now the question of whether it is the manufacturer who is supplying the demand or creating the demand for added grace, while interesting, need not be decided here. All we need know is that both the manufacturer and the consumer of furniture, china, fabrics, wall paints, etc., want the best man there is in their respective trades, and the schools can at least turn the prospective designer out in such shape that the manufacturer can use and develop him to their mutual advantage.

It would be interesting and instructive for us to look on the shelves of our public libraries for numbers printed even five years ago of magazines and journals with which we have become familiar. Such magazines for instance as American Homes and Gardens, The House Beautiful, Arts and Decoration, Country Life in America, and last but by no means least, Good Furniture. If we found any of those magazines existing at all the illustrations would admirably serve as milestones by which to note the progress made in the various industries in America during the past five years. It is, I think, an unquestionable fact that the type of illustrations published has increased the demand for a higher standard of design in our homes and so we find, as it were, a popular and modern parallel to the beginning of the Italian Renaissance, the desire for beauty following in the steps of the study of literature. I think it is a safe statement to make that there is not one industry that has called for a designer but has advanced not only perceptibly but enormously, and there is hardly a household article made today but is showing at least an improvement and refinement of form.

The practical designer in America has then got something to show for his past five years' work and he would seem to have substantially justified his existence even if that existence has been called into being by industrial competition. The successful designer in the industries, then, is he who recognizes and meets conditions as they are, who thru training and the study of the best examples of the past can learn from them what he can successfully adopt, or adapt to the requirements of the present, one who can adapt modern methods of manufacture to the production of articles which shall combine grace with utility so that the greatest number may be accommodated, benefited and elevated.

The designer is thus apparently a necessity, a man who can not only help business but one who can, by the influence of his expression, add what I choose to call mental comfort as well as bodily comfort to our daily life. We will consider how such a man has been trained for the work he is doing, and find if that training has been the best of its kind and if it can be improved. First, however, it would be interesting to glance for a minute at the training the designers of the past, whom we recognize as masters, received and see how much, or how little, we are able to learn from their experience. It is possible for us to know something about their training; we know something of the studies of the sculptors, the architects, the silversmiths of the Renaissance, and the points which impress me most forcibly are the severity of the discipline, the amount of study and work they accomplished and the fun they had in their work. Their training was to familiarize themselves with the works of antiquity and to apply the knowledge they had themselves dug out. To me it seems that they were made to hew the road they had to travel—they were studying design and applying their knowledge simultaneously. Michael Angelo did not simply happen—he must have actually practiced drawing—he must have studied anatomy. He did not simply guess at the principles governing weights and strains in architecture. His color sense and his poetry may have been inspirations, but there must have been, in addition, real grinding study and continual application. In his case as in that of others, there seems to have been to one ounce of theory a ton of practice.

The lesson, then, I gather from the masters of the Renaissance was how little the instructor did and how much was put up to and expected of the pupil, and there lies my kick with my own individual art education—my drawings were revised, they were not explained. I had to copy,—I was not expected to use imagination. In the architectural class as in the designing class, I was told facts,—I had no reasons given me.

As students, I have no doubt we have all had the experience of being taught both in an interesting and in another fashion. If I had to define why some instructors made their subjects interesting while others were decidedly dry, I should say some so handled their subjects that they made an appeal to our imaginative qualities, while others gave us theoretical facts. The fact that two times two equals four can be of no real interest to any one of us, but when we are instructed that two times twice our present income means the possibility of a new motor car, we are able to make the study of mathematics appeal to our imagination. Desire is developed which is the first step to attainment.

What then, I think, we particularly need in training is not only the giving of a standard, but the reasons underlying why that standard was given. By this I certainly do not mean a theoretical reason but an applied explanation. It can be explained that the acceptation or application of certain forms in design, which can only be obtained thru personal effort, means personal advantage. I have had students show me examples of their work which would almost demonstrate that theory had played a much larger part than practical application. Their drawings almost indicated that they were demonstrating

the *system of teaching* drawing rather than the utility of drawing.

I may mention as a concrete example, some perspective drawings students have shown me which were rather expositions on the theory of perspective than its use in application. The application of the rules of perspective are so simple they require only to be explained to be practically applied and it is the practical application which is of use to the draftsman and to the designer. I myself spent several weeks, if not months, at an art school receiving instruction in the rules of perspective drawing, rules both unwieldy and complicated, and when I had learned all that could be taught me I was unable to actually apply or use the method. When I entered an architect's office, an entirely different method was shown me and in fifteen minutes I was able to apply practically and usefully the rules of perspective. This method I have used ever since and I have found no problem yet to which I could not practically apply and benefit by my fifteen minutes' instruction.

We will now suppose that we have found a boy who has a desire, or inclination, to be a designer. You can, with confidence, advise him to specialize in interior decorating or furniture designing. This work is absorbingly interesting. It is one of the few jobs in which one can find in a hobby, also a profitable investment, for incidentally I may hint that some designers receive probably larger salaries and wield as much influence as the most highly paid college professor, and there is also a splendid opportunity right in this town for a compeer to Thomas Chippendale. Having then found a young man with inclinations toward designing, it would be well to point out to him that he can be a draftsman quickly or a designer slowly.

The first obstacle you will have to overcome is the desire for immediate reward; the inclination to look upon one dollar at the age of 20 as being a more desirable possession than ten dollars at the age of 40. The elimination of that narrow view will help not only the world of design but the designer himself. This surely is a point we must endeavor to bring out with all possible force that the best future commercial investment we can make is to *learn* more than we *earn*.

We can demonstrate by cold-blooded figures that it will selfishly pay the draftsman to study not only drawing but design. The ability of the draftsman is necessary to the designer, but too often the student stops at being a draftsman, that is one who has the faculty of directing his hand in a given direction with more or less facility, but one who has never had explained to him or is incapable of realizing the value of imaginative quality. The training of a draftsman is not complex; if he applies himself to the copying of objects he will acquire in time an ability to draw which, altho convenient, is neither rare nor of much commercial value.

Given the inclination it is possible that most of us would, with practice, be able to draw more or less accurately. There is, however, considerably more required of a designer.

A young man who intends to become a designer should be able to make a decent freehand drawing; he should not only understand what drawing to scale means,—he should be able to actually apply his knowledge. He should understand what an elevation and plan are and what a section means. I should like him to have, but I hardly dare hope that he has, drawn from real life and done some color work from an actual object and that he has not been forced to copy what other men saw. I hope he has tried to make a design of some sort for he will have been using his imagination; he will have been *drawing* on his own resources. I should be most interested to hear he had had some manual training, that he has known what it is actually to make a thing, how much effort and thought the making of the simplest object requires.

Above all, I should be delighted if he understood that drawing and designing *were the means to an end*, that a drawing or a design was but the medium with which to express a thought, that the actual executed object was the goal. I should like to learn that he understood that design was a thing to be practically applied and that he had applied design in having made a box, a stool, a table, a piece of bent iron, that he had designed if he had printed a page and that the spacing of the type and the plain margin was as much a design as the design for a tile or a piece of wall paper.

I trust that our friend will have at least obtained a glimpse of the fact that theoretical design, as theoretical religion, is a useless thing unless it has a definite reason and can be practically applied and used. In asking then for all these qualifications in the prospective designer, as instructor, it may interest you to learn what has happened to the 21 boys I have tried to make practical designers during the seven years I have spent in America. Of the 21 boys, seven were high school graduates. Three came to me from the Pratt Institute in Brooklyn, one from the School of Applied Art in New York, two came from architects' offices, one had been a cabinetmaker, one an upholsterer, while one came from a butcher's shop. The other five boys were boys who wanted any sort of a job. Today, without exception, the seven high-school graduates are making good. Incidentally it might be interesting to learn that they are making from $18.00 to $25.00 a week and what is still more valuable, they are thoroly interested in their work.

Of the three students from the Pratt Institute, one is desirous of becoming an artist, that is, a painter of

pictures; one is at present a draftsman and I think will remain a draftsman all his life; the remaining student has made splendid progress and is now a designer in one of the leading decorative houses in New York.

The young man who was a cabinetmaker has specialized in construction. He is interested in the subject and so gets the useful but unremunerative job of detailing construction. The upholsterer has left the drawing office and is now a carpet salesman. The pupil from the School of Applied Art having applied his knowledge of art for one year, has written me to the effect that he thinks art is all rot and that he is sure he can make more money selling fabrics in a wholesale dry goods house, and I have no doubt but he will demonstrate the correctness of his view.

The two pupils from architects' offices both are successfully filling their positions and the boy who five years ago was a butcher is now doing exceedingly good work as a designer of interior decoration. He has specialized in color and as a designer is earning and worth $40.00 a week. Of the remaining five boys who wanted any sort of a job, one is a bell boy in a hotel in New York; one is on the vaudeville stage; two are clerks and one is still an office boy.

From all these I learn that the best pupil I can find is the high-school graduate who has had an all-around training in drawing and manual training. I am afraid I do not place a very great deal of weight on the boy who hopes ultimately to be a designer spending many years at manual labor, and it does not seem to me that it is either practical or desirable that to be a successful architect one should personally have laid brick walls, mixed cement, hewn stone, fitted up steam pipes or that he should have been a plasterer or carpenter. He certainly must understand the nature and quality of his medium but his understanding ought to come thru study. I do not admit that because I find it advisable to use a smooth board for a table top that I should go to the forest to select and cut down the tree, to have hitched up the horses to draw it to the saw pit or to have personally sawed and planed, joined, sandpapered, and varnished it. The artist craftsman is one of the most interesting people we have in the world of art but we have to deal not with the designer of 1616 but with the practical designer in the industries of 1916.

When I think of all the designers and draftsmen I know, or have met, either in Europe or America, I know of few designers of any prominence who have graduated from the bench or have done any actual manual labor.

The first thing a prospective designer of furniture will have to learn, if he comes to me, is to draw accurately to scale. He will have to become familiar with the appearance of objects of everyday use, such as tables and chairs, when they are drawn in elevation and plan; he will have to learn to visualize in mind the combination of plan and elevation. I am unaware how much scale and elevation drawing is generally taught in American schools, but even an acquaintance with the subject would not only be desirable, it would be practically useful to nearly every man. A month's practice in the furniture office, working to scale and making simple elevation drawings will be his first step in a practical training. He will have to become acquainted with sections; not sections alone in drawing but as portraying an actual finished object. He will have explained and demonstrated to him the part that mouldings play, how their different shapes reflect light when placed at varying heights. When studying sections it will be explained to him why some mouldings can be made readily by a machine and why other mouldings cannot be so made. He will be shown practically how mouldings are run and built up. Simple forms of constructions will be shown him both in actuality and as they appear on paper. It will be demonstrated why pieces are constructed in a particular manner so that he will grasp that construction is no mysterious affair, but that all construction is based on what is miscalled "common" sense. He will have the opportunity to familiarize himself with the different machines and what they are capable of doing. He will become acquainted with the appearance of different woods and will have learned something of their particular characteristics and how these particular characteristics govern their various uses.

So far what he has learned has been taught him; he has of his own initiative learned nothing but has only applied instruction. I hope, however, that meanwhile he has had ambition enough to begin an attempt at designing, preferably at home in the evening. I trust that his interest has been aroused sufficiently to have him endeavor to emulate the designs he has been working among. It is to be hoped that it has been continuously impressed on him that he can learn a hundred times more than he can be taught, so that he will at least attempt design. I should like to impress upon the young designer that he will make more headway by being directly influenced by standard examples than by striving after what he imagines to be originality. Originality, while being one of the most valuable qualities a designer can have, if not based on the same principles which governed the designs of the past, are apt to be more or less freaks.

As soon as our pupil has made his first attempt at designing he has commenced his life's work. He has had his first glimpse into the world of creation and he has at least begun to learn that no matter how long he lives he will be learning all the time. He will appreciate, as each day passes, how much more there is to know. I could go on and tell you something of the different characteristics of style the designer of furniture would have to become acquainted

with, but this could hardly, or need hardly, acquaint the student while in school.

The one outstanding acquisition I hope he will have, will be the fun of working for the very joy of it, to appreciate that it is possible to have a hobby all absorbing and entertaining, the pursuit of which brings mental and material comforts as well as an entirely satisfactory material reward.

A Manual Training Experiment in New York City

William Andrew Carter, Teacher of Shopwork, Public School 90, Queens, Richmond Hill, New York City

IN the work we had been doing, previous to the experiment here described, the projects constructed were all of good size, useful, and, as I thought, interesting. In 7A we had been making a coat-hanger, a shelf and a towel-roller. In 7B a knife-box and one other project, generally involving lap and dado joints, such as a tie-rack, plant-stand or tabouret. In 8A the boys had constructed a book-rack and foot-stool and in 8B anything from a simple costumer to chairs, tables and even clothes closets. In all the grades except 8B the work had been class work, that is, all the boys in the same class made the same thing at the same time. For all this, however, there seemed to be something wrong. There was not the snap to the work that I thought there ought to be; not the interest there should have been.

In studying the problem, I looked back upon the work of past years to see if there was anything that stood out as being radically wrong. In thinking over these questions it occurred to me that the boys had had very little to say concerning what they had made in the shop. The drawings had been furnished, the size stated and practically no choice or freedom of any kind allowed. About the only opportunity afforded for self-expression was how the parts to be modified were to be shaped and what colored stain he preferred to use. Having found one cause of the seeming lack of interest, a number of other things began to suggest themselves and to help me see the way out of my difficulty.

First, I found, when giving little talks on industrial processes and on the way things were done in the big shops, that the boys were intensely interested. They would hang on every word and ask all kinds of questions. The next week some of them were sure to have something more to say along the same or other lines of industrial activity and when I asked them where they had obtained their information they invariably told me that they had gone home and told their folks what I had told them, and their fathers had told them more about the same thing or other things of similar practical interest. Secondly, whenever a boy asked how something was made, or done, no matter what it was, I did my best to explain the process fully, not only to him but to the class, illustrating where possible. For example: A boy asked how molding for trim is made. Another asked how a certain piece of iron was formed. In answering him I explained pattern-making and molding, taking the time to make a simple pattern and a mold in common sand. These explanations, too, seemed to be interesting to the boy. Thirdly, while teaching an evening school class in shopwork, I found that boys who had been proficient in day-school work and who had entered the night school after being away for two or three years, had almost entirely forgotten all those things which, in day school, I had tried to impress upon them as being important. I asked myself why they had forgotten it and concluded that what I had taught them was not as important as I thought it was, that it was not interesting, or did not have that relation to bigger things that it is essential for information to have, if it is going to have any broadening influence or permanent value.

With these things in mind I set to work to plan a course of study. The first thing decided upon was to try and arrange the work so that the course of study would consist of a set, or series, of problems instead of a set of projects or models. The word project is used here to mean a model or article to be constructed from a drawing furnished by the teacher, and the word problem is used to mean a principle or method to be used. For example: If a class makes knife-boxes, from a drawing furnished by the teacher, for the boy that would be a project; but if the class were to construct a butt-jointed box and each boy were allowed to make any kind of a butt-jointed box, suitable to his own purposes, that would be a problem. There are two reasons for choosing this method; first, it gives the teacher the opportunity to choose one from a number of models any one of which will fit the desired situation, and it gives variety, the best thing in the world for keeping a teacher out of the rut; and, secondly, and most important of all, this method gives the pupil an opportunity to work out his own problems, to do his own thinking and planning, to develop his initiative. In other words the work is to consist of individual problems in place of class projects.

The next most important thing to consider, I thought, was to include some work in a number of materials in preference to all the work in one material, or, to put it another way, to include work related to a variety of industries, in preference to cabinetmaking

alone. This would give the boys an insight into how the different lines of work represented were carried on and would be an answer to the great number of questions that the boys constantly ask as to how things are done.

The third thing to be included in this course of study is some work in industrial organization or, in other words, on the factory plan. The idea here was to give the boys an understanding as to how work in the big factories is organized, how jigs are used and the large part they play in making it possible to use unskilled labor in the production of complex articles.

The last thing to be included in the course of study is some work of the communal type; something in which all the boys could have a common interest; something for the school; something for the community. For these two last suggestions I am indebted to Mr. Albert W. Garritt, Assistant Director of Shopwork in New York City.

The Course of Study.

In working out the course of study it seemed that the problems should consist of a series of types of construction in preference to a series of tool operations or exercises. I feel that, in the elementary school, we are not training our boys to become mechanics, expert in tool manipulation, and that the boys would get more out of a series of *types of construction* than out of a series of *tool operations*. It may be noted here that the introduction of the more complex tools and tool operations follows, in a general way, the logical order in which joints or other types of constructions should be taken up. What more should we expect of our boys than enough tool skill to enable them to accomplish the desired result, to wit, to develop the initiative of the boy and to give him an industrial insight? Then too, having a series of types of constructions instead of a series of tool exercises makes it possible to carry out more fully the scheme of having each boy choose his own project as a solution of the problem being solved. Again, in choosing the series of types of construction, instead of a series of tool operations, it is possible to make every problem have some industrial content; i. e., in 7A the second problem taken up is the construction of a bracket shelf. The boy may make any kind of a butt-jointed shelf, suitable to his own purposes, but in working out his problem the innumerable uses of the bracket or brace in construction can be shown, as in roofs, bridges, scaffolding, etc. To carry this illustration a little further, in constructing this shelf the need of knowing how to make convex and concave cuts, with the chisel, becomes apparent when the time comes to modify the various parts of the shelf. This tool operation is then taken up but as subordinate to the construction of the shelf itself.

In planning the course of study it will be noted that the special work introduced, the cement, the molding and communal work, is not taken up until the middle of the second and third terms. The reason for deferring this work until then is to allow time for the boys to acquire sufficient skill in the use of tools, enabling them to work out these problems independent of any instruction in tool practices.

The work planned for 7A is as follows:

Problem 1. To square a board to a given size.

Problem 2. To cut a board to other than to a rectangular form. (This problem is taken up in connection with problem three and is included in it.)

Problem 3. To construct a bracket shelf. (Butt-jointed.)

It will be seen immediately that these problems involve all the fundamental tool processes such as sawing, planing, squaring lines, measuring, chiseling, etc., and for the purpose for which this course is designed, to wit, to develop initiative and give an industrial insight, give sufficient repetition in these tool operations.

In solving these problems a boy may make any project, within the limits of the material available, which satisfies the conditions of the problem. The problem is discussed in class and the boys directed to bring in, for the next lesson, working drawings of the shelves that they want to make. The drawings are discussed and checked before the boys are allowed to mark out their rough stock and saw it up. Figure 1 shows a group of boards offered as solution of problem 1. Figure 2 shows a group of brackets made in connection with problem 2.

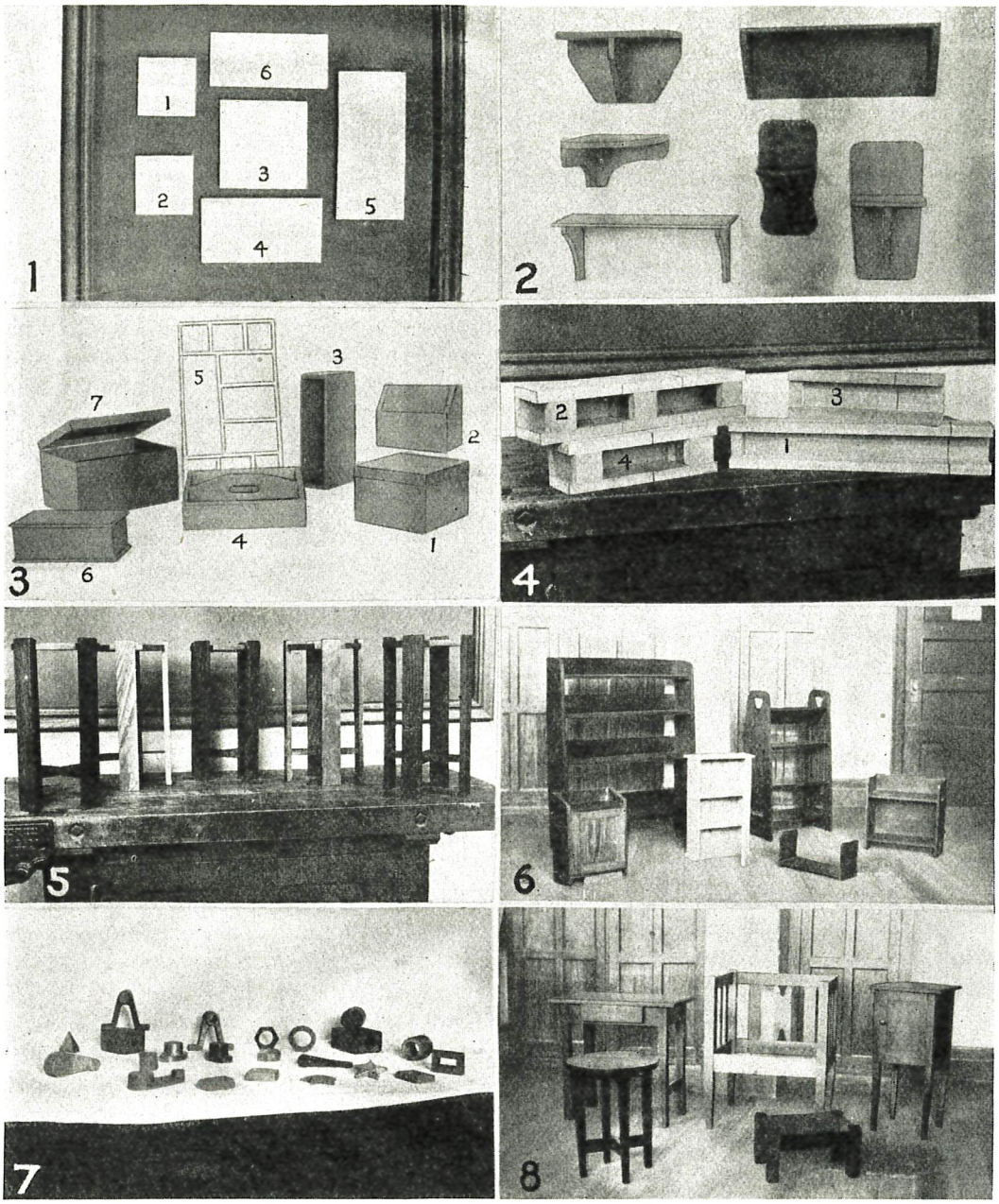
In 7B the problems taken up are:

Problem 1. To construct a butt-jointed box.

The principles of box construction are taken up and discussed as is, also, the manufacture, by machinery, of boxes for the trade. Figure 3 shows a group of boxes made by 7B boys.

Problem 2. Problem 2 calls for the construction of cement molds for plant-boxes, plant-stands, etc., and filling them with cement. This problem may be taken up as an individual problem, each boy making his own kind of mold, or it may be taken up as communal work, the class being divided into groups, each group making a mold, different in size or shape from that of the other groups. Part of the work of this problem consists of discussions; such as of the use of cement and concrete, the principles of reinforcing, fireproofing, etc. For economy of time we have taken up this problem as communal work. When the molds are finished they are filled and set aside to allow the forms to harden. Thereafter, during the working out of the third problem, each group, in turn, is delegated to clean and refill the molds until enough have been made for every boy to have one, or the plant boxes may be made for the school.

Problem 3. Problem 3 consists of making some problem on a factory basis. The class is divided into groups, depending on the kind of project constructed, each group working on a part of the project. The groups, in turn, are subdivided so that each boy has one particular operation to perform. The boys are changed from operation to operation so that the monotony of the work does not cause the problem to lose interest and so that each boy will have an opportunity to work on the several operations. Each group is in charge of a "Boss," chosen by the boys of that group. It is interesting to note that invariably the best worker is chosen. The boss is in charge of the work of his group and has the power to dismiss any boy who is not putting his best efforts into his job. A boy who is dismissed gets a "C" in proficiency until he gets a job with another, or, under certain conditions, with the same boss. In connection with this let me say that in the two terms that this problem has been worked out, there has been no friction between the workers and the boss.



1—Group of boards offered in solution of Problem No. 1, Grade VII–A. 2—Brackets and Shelves, Problem No. 2, Grade VII–A. 3—Boxes made by boys in Grade VII–B. 4—Jigs used in making tabourets, Grade VII–B. 5—Completed tabourets. 6—Furniture made as Problem 1, Grade VIII–A. 7—Lead castings and molds, Grade VIII–A. 8—Framed pieces made by Grade VIII–B.

In working out this problem, jigs are used wherever possible to facilitate the work. The jigs are the result of suggestions made by the boys. These suggestions are discussed and tried out before the

class. Again, the class decided how many boys were needed on each operation and if one boy were either overworked, or if he did not have enough to do, the class was called together for discussion and the necessary readjustments made.

In connection with this problem, the class discussed the advantages and disadvantages of specialization of the work; what effect it had upon the quality and quantity of the work and its effects upon the workman. The boys were told to ask their fathers how things were done or made where they worked, and these reports were discussed in class. The reports proved very interesting.

For the last two terms, the project taken up in this connection was the construction of a tabouret. Figure 4 and 5 show the jigs used and the completed tabourets. These tabourets, as a whole, were about 90 per cent perfect; the chief defects were in faulty surfacing and poor sandpapering, the joints being all good.

In 8A the first problem taken up is case construction, a case being understood to mean a form made of wide boards and jointed with dado, mortise, or rabbeted joints, or, combinations of these joints. Under this head such projects as book-cases, book-racks, medicine-chests, wall-cabinets and other like projects can be constructed. The underlying principles of the given type of construction are discussed and each boy is expected to bring in a working drawing and construct a project suitable to his own purposes. Figure 6 shows a group of these cases made by 8A boys.

Problem 2. How metal castings are produced.

In working out this problem the patterns are furnished by the teacher. The principles of molding are taken up and discussed and the proper demonstrations given. The first pattern molded is a plain rectangular block. Next a pattern requiring a green sand core is used, then a split pattern. After this come patterns involving cores; such as bushings, plain cylinders, and a T-pipe. Each boy is given an opportunity to mold each type of pattern and to pour his mold with lead. In connection with this work the boys are given short talks on iron, steel and brass molding, the melting temperatures of these metals, their shrinkages, etc. As a final project each boy is allowed to make, and keep, a pattern and casting of some simple object; such as an inkwell, a paper-weight, miniature anvil, etc. This seems to me to be a live problem for any section, for while there may not be a foundry in the vicinity of the school, or even in the town, there are so many castings used everywhere that an interest is created the minute the boys are asked how the pieces of metal are formed. A fifteen-minute hunt in the shop disclosed the fact that there were over a thousand pieces of metal that had been formed in a mold. Think of the total number of castings used in a school seating over two thousand pupils.

The question will naturally come up here as to what equipment was used in this work. For molding benches we used two discarded kindergarten tables. The rammers were made out of pieces of 2 by 2 whitewood; they were crude but worked satisfactorily. The sprue pins were planed up by hand. The only tools bought were two slickers about one and one-half inches long. At first we used common sand and, with the exception of rough castings, it gave pretty good results. At present, we have some molding sand that was given to us by the local foundry. For melting, we used an ordinary gas stove and a handled iron pot.

Figure 7 shows a group of castings and some of the patterns used.

Problem 3. Communal Work. Under this heading any work desired for the school is made. During the past year we made a reading stand for the auditorium, a May-pole for the Public Library, about thirty feet of shelving for the school's model store, forty small bulletin boards, and numerous smaller articles. When these things were needed as many boys as possible were put upon the job and each 8A class, in succession, worked on the project until it was completed. In this way the reading stand was completed in one eighty-minute period, all but staining; the May-pole, too, was completed in one period. The shelving for the store took three eighty-minute periods, each of our 8A classes giving one period to the work.

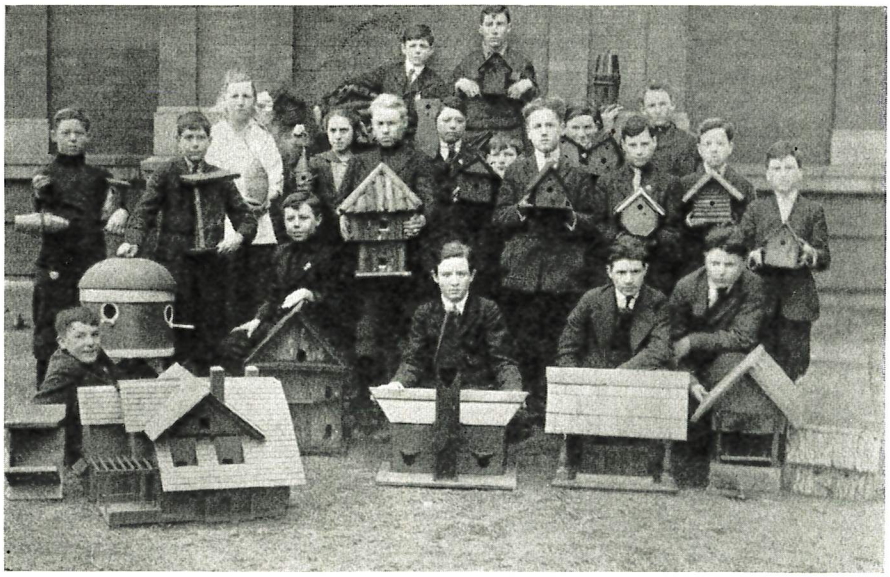
In 8B there is only one problem taken up, namely, Framed Construction, or forms made of joist and boards and joined with mortise and tenon joints. Under this problem anything of the box frame type, such as, foot-stools, umbrella-stands, tabourets, boot-jacks, chairs and tables can be made. No limits are placed on overall sizes in this grade but if the material needed costs more than thirty cents, the boy must furnish his own material. Figure 8 shows a group of projects of the framed type.

Having planned the course of study I did not try to introduce it all at once. First, with one section of 7B boys, we tried out the cement problem. We spoiled a good deal of cement before we found out what the best mixture was. At times we were ready to quit but we stuck to it and, finally, were successful. The hardest problem was to get the proper kind of sand, sand that was sharp and free from loam. Next, we tried out the molding and this, too, gave me quite a little concern, as I found that the boys spent too much time on making the patterns and did not get the proper results. I eliminated the patternmaking and took up the problem as one of molding. The change proved quite satisfactory and I have since followed this scheme. Having found out that the two hardest problems, to

me, could be worked out successfully, in September, 1914, I started out to teach the new course of study in full and I feel that the results more than justified the change in procedure.

In solving all of these problems, in only two of them are the boys restricted in the choice of project they are to make. In the factory problem, variation is obviously impossible and in the problem on molding, for reasons of expediency, it is necessary that the patterns be furnished by the teacher, but in both cases the information and general training that the boys get out of the work far outweigh any advantage to be gained by having each boy select his own project.

To supplement this work and the shop talks and discussions, a series of stereoscopic pictures, "The World Visualized," is used to give our boys a broader conception of the industries. By means of these pictures, the boys get a better idea of the scope and method of industry than any amount of lecture work would give them. In 7B two half periods were devoted to looking at pictures showing logging and lumbering operations. In 8A, while working on the molding problem, a period was given over to looking at pictures showing the mining, transportation, handling and smelting of iron ore. Besides these pictures, *the school* owns a small moving picture machine. (Bought by the Athletic Association.) Occasionally moving picture shows are given at which pictures showing mining, grain and cattle raising, lumbering, ship-building, etc., are shown. In this way our school does what it can to give our boys and girls a bigger and broader idea of what the World is and how man uses it.



Bird Houses made by Boys and Girls of the Seventh and Eighth Grades, Waterloo, Ia.
Mr. Godfrey Messer, Instructor.

Costume Design for Dressmaking Students

Minnie G. Rackle, Instructor of Design and Art Metal Work, School of Industrial Arts, Trenton, N. J.

Introductory. There are three important points to be considered in the planning and making of clothes. These are (1) Service, (2) Durability, (3) Beauty. It would be very hard to decide which of these three things is of most importance, which of second importance, and which third. That would be governed more or less by the amount of money one can afford to spend upon clothes. If, of necessity, one can spend very little, then, of course, durability is most important. If money is not to be considered, then beauty may be our first consideration. But, even when very little can be spent upon clothes, beauty may be made a very important item without affecting the durability and service.

By the word "beauty" in clothes, we mean, to be more exact, becoming clothes. A gown may be very beautiful in itself, and yet not be beautiful when worn. To be really beautiful it must be becoming. It is just this one point which must claim our attention now. We will return to the other two (service and durability) in connection with it, later in our study.

Our purpose then, is to learn to dress becomingly. Every woman realizes what a difference that makes in her appearance. We have all seen the woman who apparently "looks well in anything she wears." It will be well to consider why she does. The woman who always looks well, looks so for one of two reasons. First, she may be fortunate enough to be of the average normal size and proportions, which require no especial lines in the gown to affect or emphasize those in the figure which are too pronounced or too weak. The lines of her figure are so evenly balanced in themselves that the gown cannot make a great deal of difference one way or the other. But even this extremely fortunate lady must be careful of the colors she wears. Now we all know that this woman who always looks well is not invariably a woman with a perfect figure. If she has not a perfectly proportioned figure and yet always looks well, she must have good taste. She, either consciously or unconsciously, knows what sort of clothes she ought to wear. She chooses gowns with lines which will offset the too prominent ones in her figure, and strengthen the weak ones. She may not know the reason, but, she knows. You will find also that this sort of person does not follow the styles too closely. She never wears extreme things. She keeps firmly to those things in which she knows she looks well. This does not mean that a gown can not be stylish. It can be of the latest fashion, but modified to fit the needs of the individual. The blind following of fashion is the greatest hindrance to dressing becomingly and with individuality. We all know, and it is such a common thing, with present day styles, how people will wear the thing which is the fashion, regardless of whether it becomes them or not. How often we say that we would not wear this or that, because it is "so common." The thing in question may be very pretty in itself, and might happen to be becoming to us, but we will not wear it because it is "so common." The real reason that we object is, not because it is so common, but because so many people are wearing it to whom it is unbecoming. If only people who looked well in it wore it, we would not think of objecting.

So in this course we will learn to know our figures, to study their good points, their bad points, and their weak points. Then we will learn how, in planning a gown, we can emphasize their good points, cover up their bad points, and strengthen the weak ones.

A prominent dressmaker once said, "It is the line that makes the gown." No matter what the material or what the trimming or how well the gown is made, or even how well it fits, if the line is bad or simply unbecoming to the person who wears it, that gown is a failure.

Notes Dictated: The purpose is to learn the fundamental principles underlying the plan of a costume. The object in view is to learn to dress becomingly and with individuality.

Styles should never be followed regardless of their becomingness. Never choose extreme styles. It is far better to be too conservative.

The Study of the Average Normal Figure: By the "Average Normal Figure" we mean a figure drafted from the measurements of a normally proportioned woman of average size. We will frequently speak of it as the "Perfect Figure" for convenience. However, we can realize that in the strictest sense of the word the term "Perfect Figure" would take us back to the classic Greek. We do not mean to use the classic for our standard, for there would be very few women today who could measure up to it. So when we speak of the "Perfect Figure" we mean simply the average normal—a figure of average size with waist neither too long nor too short, shoulders and hips of normal proportion.

(Here the figure is drawn on the board. The class follows the drawing of it, line for line, with rulers, in their notebooks. (A notebook without lines, measuring 6″x9″ has been found convenient.) Each student is supplied with a blueprint of the drawing of the perfect figure, giving dimensions.) Fig. 1.

Notes Dictated: There are certain proportions of the well formed figure which are always to be used

as measurements or guides. Some of these are as follows:

1. The width of the shoulders is equal to the length of the waist. (The width of the shoulders is found by a horizontal line passing thru the pit of the neck. The length of the waist is measured from the pit of the neck to the waist line.)

Study of Students' Figures: The students may be paired off so that they can take each others' measurements. Each one is supplied with a large piece of wrapping paper so that the figure can be drafted full size. This is pinned to the wall, and the student stands with back to it. (Fig. 2.) A yardstick and small ruler are needed for measuring. The height

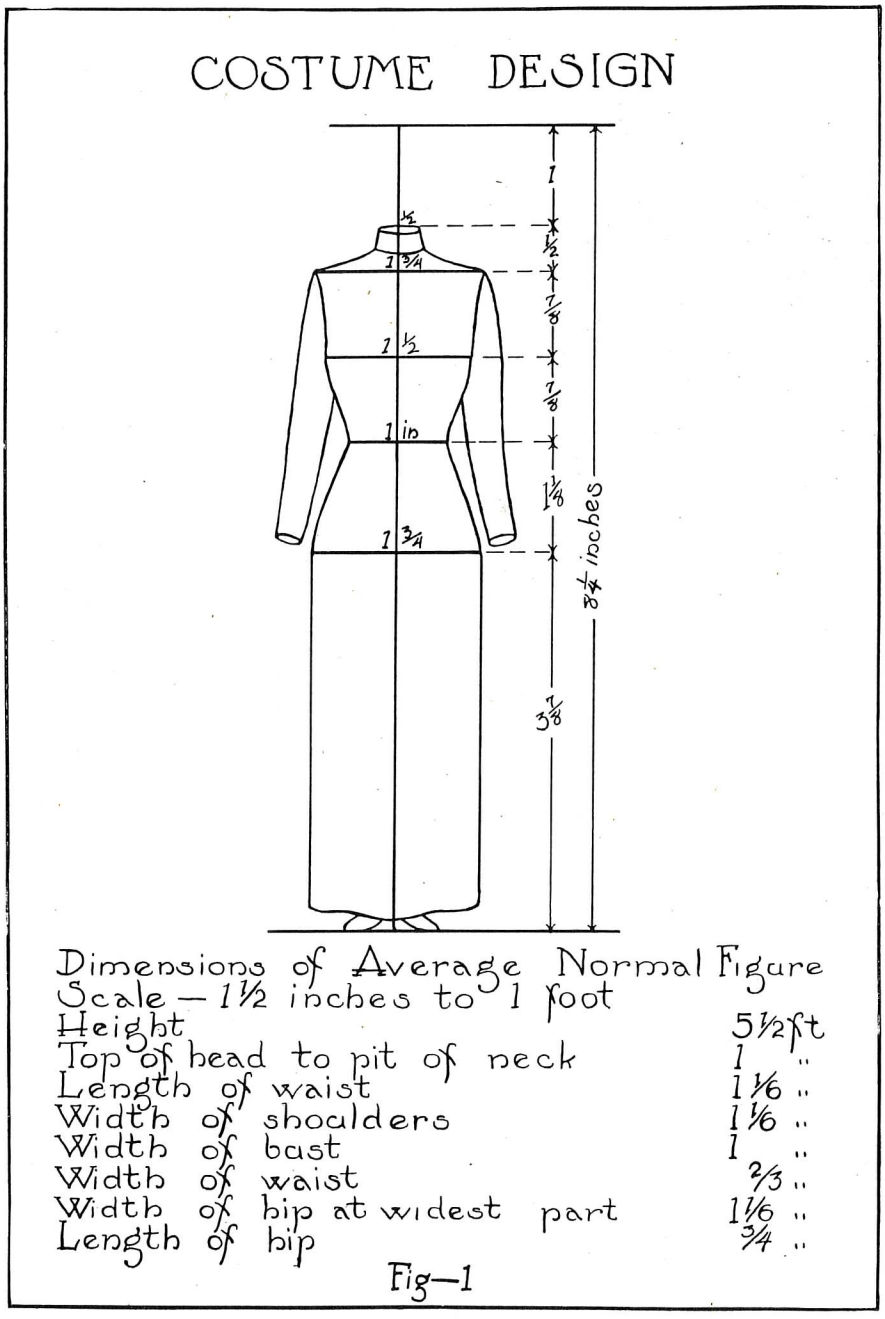


Fig. 1. The Normal Figure.

2. The width of the shoulder is equal to the width of the hip at the widest part.

3. The elbow should come to the waist line.

4. The base of the thumb comes to the widest part of the hip.

5. The bust line comes half way between the pit of the neck and the waist line.

of the figure is first marked. Then the yardstick is held across the shoulders so that the upper edge passes thru the pit of the neck. By holding the small ruler against the side of the shoulder just at the top edge of the ruler, and at right angles with it, the point can be marked with a pencil. The widths of the waist and the hips (at the widest part, usually

Fig. 2. Students Taking Measure.

about 9 inches below the waist line) are taken the same way.

The paper can then be taken from the wall and the measuring lines drawn from the points taken. First a vertical line is drawn from the head measurement down. (Fig. 3-a.) Then the shoulder, waist and hip widths are drawn, with care to put half of the distance on each side of the center line. Sometimes the measuring points are a bit crooked and must be shifted to one side or the other, so as to be straight with the center line. (Fig. 3-b.) The bust line comes to a point half way between the pit of the neck and the waist line, and is equal to 6-7 of the shoulder-width measurement.

Then the measurements should be copied into the notebooks, with care to take all eight of the measurements used in the drawing of the perfect figure. These are:

Height
Top of head to pit of neck
Length of waist
Width of shoulder
Width of bust
Width of waist
Width of hip at widest part
Distance below waist line of hip measurement

For convenience the fraction of inches may be disposed of in these measurements. When the fraction is $\frac{1}{2}$ inch or less, it may be dropped. If it is over $\frac{1}{2}$ inch, the next inch higher is used as the measurement. Then reduce all of these measurements to feet and fractions of feet, disposing of the inches entirely. For instance, a shoulder measurement, if 1 foot 2 inches, would be called $1\frac{1}{6}$ feet.

The next step is to reduce the individual figure to the same scale as the perfect figure so that a comparison can be made. The scale used for the "Perfect Figure" is $1\frac{1}{2}$ inches to the foot, so that the students' measurements are simply multiplied by $1\frac{1}{2}$. Then a drawing is made in the notebook in the same manner as that of the perfect figure.

In order that a definite comparison can be made of the student figure with the perfect figure, we now make a third drawing of the two, one on top of the other. (Fig. 4.) First make a careful drawing again of the perfect figure, from the blueprint, with a pencil. Then make the drawing of the student figure on top of it in colored pencil, being careful to put the floor lines and center lines one on top of the other. To find the top of the collar, measure down $\frac{2}{3}$ of the distance from the top of the head to the pit of the neck. This gives us the *top* of the *back* of the collar. This measurement (from an anatomical point of view) is actually the chin measurement, but since the chin comes to a higher level than the top of the front of the collar, we use it for the *top* of the *back*, simply dropping the front about an eighth of an inch.

From this drawing each student can easily see just where her figure differs from the Average Normal, or Perfect Figure. If she is short-waisted, the

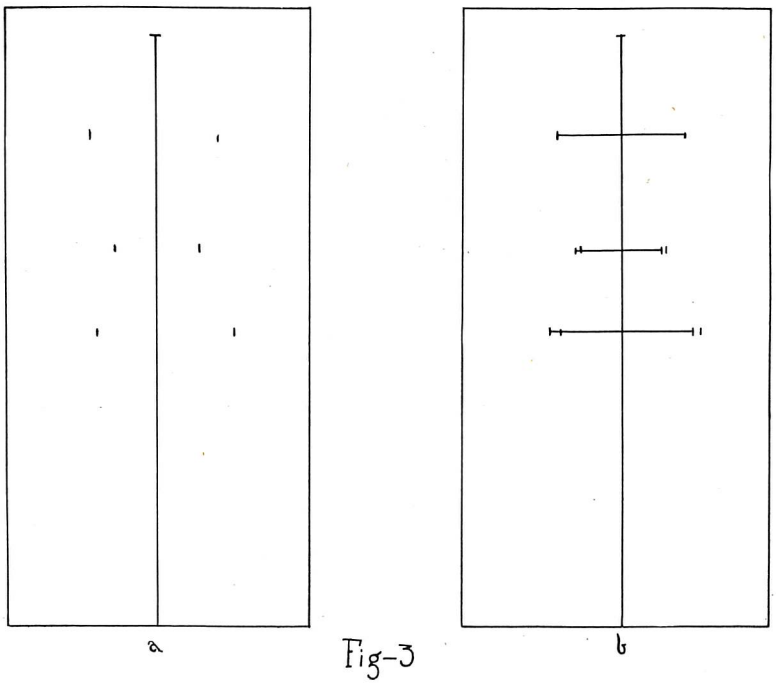


Fig. 3. The Measurement Paper.

drawing shows at once just how much. If the hips or shoulders are too wide, or the waist too narrow, the drawing shows it all. Then the following talks can be given on how to correct each of these ailments, by using proper lines and proper materials in the costume.

The Correction of Figure Proportions By Lines: By this time each student has probably discovered what parts of her figure need correction. We will take each of these imperfections separately and discuss its cure. But before we do this, there is one rule on the psychology of lines which we must all know. It is this: Parallel lines tend to lengthen an object in the direction in which they run: first, because that direction is emphasized by the lines; second, because the opposite direction is cut into small divisions by the lines. Now we shall see how this can be applied to the figure. If a figure is too short, we should use up-and-down lines to emphasize its height. If it is too tall, we should avoid up-and-down lines and use cross lines. These cannot, of course, be made too prominent, but can easily be introduced by using cross trimming on the skirt, and a wide, prominent belt. The lines required for a figure may be made by the actual lines in the design of the dress, or else a striped or figured material may be used to secure the desired effect.

Notes Dictated:

Stout Figures: Avoid anything that enlarges the shoulder proportion, such as sleeves that are large at the top, large collars, yokes forming a cross line high on the shoulder or across the bust. Avoid cross lines, large figured, or very prominently striped material and bright colors. Avoid anything that draws attention.

Should wear vertical lines, simple designs, skirts neither too wide nor too narrow (no matter what the fashion) and always a belt of medium width, never a very wide or very narrow one.

Thin Figures: Avoid clothes which fit too tightly, vertical lines and stripes, especially prominent stripes.

Should wear cross lines, wide belts, figured and plain material.

Sloping shoulders should never wear kimono or raincoat sleeves, or drop shoulders of any sort, but always a shoulder seam with a set-in sleeve.

The waist line may be corrected, if too high, by using the belt below the actual waist line. If too low, the belt may be used above actual waist line. The belt may be made wide or narrow as occasion requires. The waist line may be lengthened too, by using a short yoke on the shirt.

On the Designs of Any Costume: Lines of the waist should always be continued or repeated in the lines of the skirt. The skirt and waist should seem to "go together."

The lines in the design of a dress should follow the lines of the figure as much as possible.

Never use too much trimming.

(At this point each student may be asked to design a dress on the "Perfect Figure", naming intended use of the dress and material of which it is to be made. (Fig. 5.) Criticism should be made by the teacher before the class, asking each student for an opinion at least once. Each student's design should be considered in this way).

Materials:

Notes Dictated: Plain materials may be worn by any figure. Stripes, if of ordinary size, may be worn by stout figures. Very small stripes tend to enlarge a figure, and must not be worn by very stout figures. They may be worn by thin figures. Dotted and figured materials may be worn by all, except very stout figures. Checks or plaids may never be worn by stout figures, but are very good for thin figures.

In combining materials use one plain and one striped or figured material. Never use two figured or two striped materials. Two plain materials are good, however. Never use the same quantity of both materials. Use less of the material which has the brighter color. There should be some of each material on both waist and skirt, or at least on the waist and at the belt line.

Service, Durability and Beauty: When planning a dress or costume, we should always be sure that the design is suitable for the intended use as well as the material of which it is to be made. We should also be sure that the material is suitable for the intended use. This, then, is the keynote for the plan of a costume.

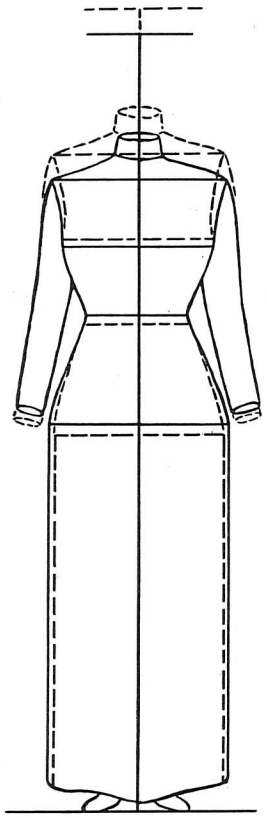
The intended service of a costume governs more or less the material of which it is to be made. It should be sufficiently durable to withstand the wear required of it. The material having been chosen, the next step is to plan a design which will be suitable to both the intended use and the material. This is very important for it can readily be seen that taffeta, for instance, will not lend itself readily to the same lines that crepe-de-chene will.

The trimmings too should be appropriate to use and material. If the material is washable, all of the trimmings must be washable.

Notes Dictated: The design of a dress must be appropriate to its intended service and the material of which it is made.

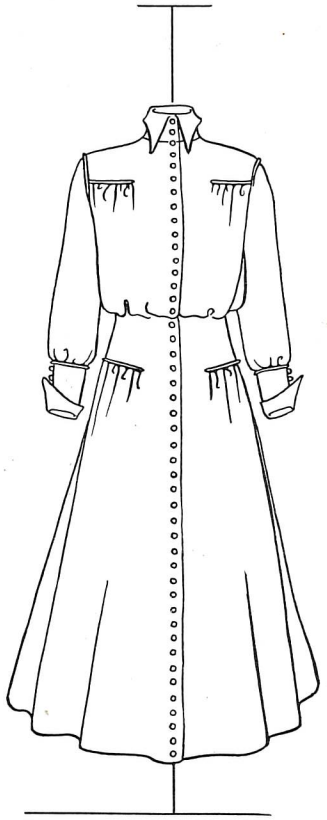
Do not use very small plaits or tucks in heavy material. Use large plaits or gathers. Do not shirr heavy material. Do not use large plaits in thin or sheer material, shirr or gather it. Thin material should be made very loose and full, never tight or "tailored."

Always have trimming appropriate to material. Never use silk or wool with cotton. Never use any-



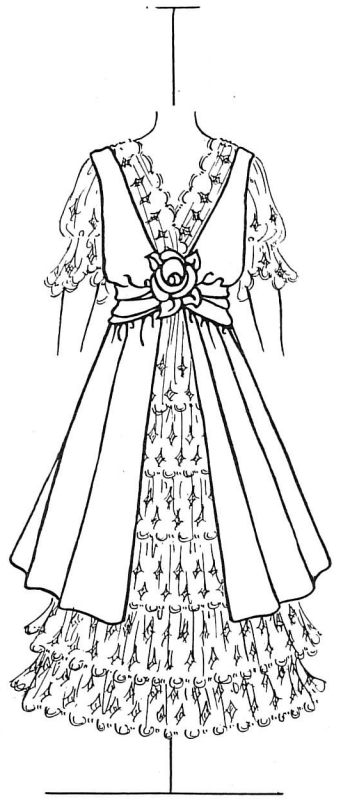
Comparison of the Student Figure with the Perfect Figure.
———— Student Figure
– – – – – – – – Perfect Figure

Fig-4



PERFECT FIGURE
Design for Street-Dress Materials—Navy-Blue Taffeta trimmed with self covered buttons and white Crepe-de-Chene colar and cuffs.

Fig-5



STUDENT FIGURE
Figure is under height, short waisted, and hips are too wide.
Design for Evening Dress Materials—Turquoise Crepe-de-Chene, white silk lace, dull pink rose.

Fig-6

thing except linen with linen. Silk and wool may be combined. Never use anything on a washable dress which cannot be washed with the dress. (This does not apply, however, to a sash, which is the only exception.)

Always design a wash dress so that it can be easily laundered. It should look as well after it has been laundered as it did before.

(Here the students may be asked to design a costume on their own figures, naming use and material of which it is to be made, and naming fault in figure. (Fig. 6.)

Colors: The subject of color is really too important to be treated in such a condensed course as this must be; and yet it is too important to be ignored entirely. We will consider it briefly here and try to touch upon all of the most important points.

We all realize that we look better in some colors than we do in others. The reason for this we seldom know. There are a few facts, however, which will help us to know what those colors are, even tho we do not know why they are. In order to do this let us talk first about color alone, not in connection with clothes.

We will speak of ten colors only. Five of these we will call primary colors, and five intermediate (because they come in between the primaries).

Primaries	*Intermediate*
Red	Red-yellow
Yellow	Yellow-green
Green	Green-blue
Blue	Blue-purple
Purple	Purple-red

Of course we know that there are a great many more colors than these, but we will take these as headings under which every other conceivable color can be classified. We do not realize, at first, how completely these ten names classify color. Any color, the influence of black, white or gray having been removed, becomes one of these ten. Take pink for example. Under what head does it come? Red. Yes, and its influence which makes it different from red is white.

Now having simply ten colors to talk about, let us see what effect they have upon each other. We will consider them in two ways. First, as to how they harmonize with each other. Second, as to how they contrast with each other. There are no laws by which we can find or make harmonious color combinations. Any two colors, or any three, or any four, if used in the proper gradations and proportions, will be harmonious or pleasing. Now let us see what is meant by color gradations. If we suggest a gown of blue and yellow, it does not sound very promising, does it? Yet, if we change the wording to peacock blue and gold, it sounds very pleasing. And yet, peacock blue comes under the heading of blue, or blue-green, and gold under that of yellow, so the gown would be virtually blue and yellow after all.

When speaking of contrasting color we are dealing with facts. Each one of these ten colors has one other of the ten for its contrasting color. By contrasting colors, we mean colors which if placed side by side, brighten each other to their greatest intensity. These contrasting colors are:

Red and green-blue
Yellow and blue-purple
Green and purple-red
Blue and red-yellow
Purple and yellow-green

So, if we put red next to green-blue, the red will look brighter than it does when combined with any other color. This is true as well of the green-blue. If you have a dress which looks colorless or dead, it can be brightened by using a bit of its contrasting color as trimming.

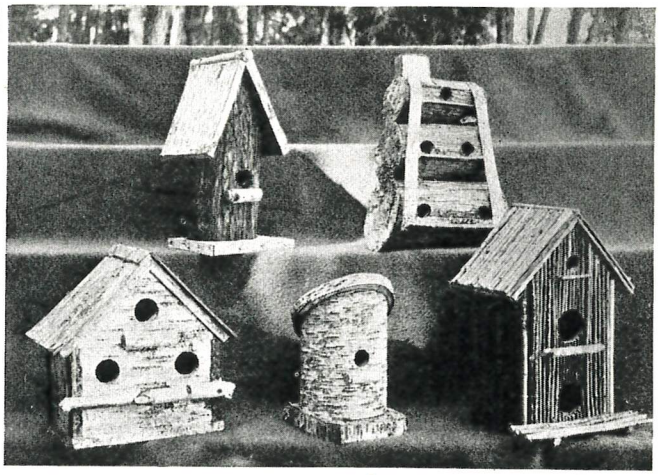
This rule of contrasting colors can be applied to the colors of the complexion and hair. If a woman has a great deal of color, she should not wear blue, or green, or blue-green. These colors will intensify her already high color. On the other hand, if a sallow skinned person should wear blue-green, her skin would appear to have more color than it has.

There are a few generally known rules about color of which we will speak. Very bright colors should be worn only in the house, and usually only under artificial lighting. All colors to be worn out of doors should be of more subdued hues. It is said that the most becoming color for outdoor wear is the color of the hair, while for indoor wear the color of the eyes is most becoming. This rule, however, can only be followed in a general way.

In Conclusion: These are only helps for dressing becomingly, and not by any means recipes for beautiful clothes. There are no rules possible which will produce good taste, which is, of course, at the bottom of all beautiful things. However, we can develop good taste by constant association with beauty and by careful judgment in our choices. There is no reason why any woman should not look her best no matter how limited her means, if she but uses good judgment.

"The foundation of every state is the education of its youth." —*Dionysius.*

Articles Made by Boys in Camp.



Birdhouses Made in Summer Camp.

WOODCRAFT IN A BOYS' SUMMER CAMP

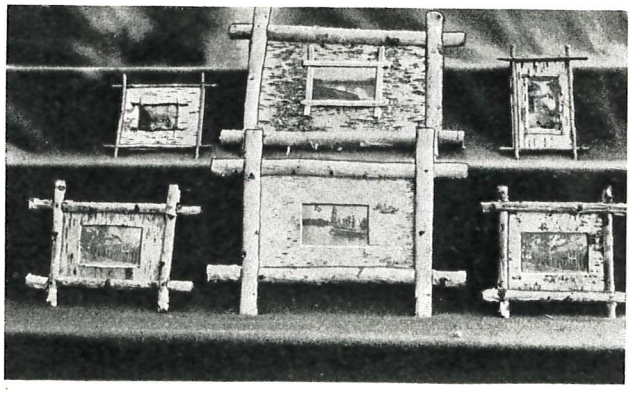
B. E. Gordon, Supervisor of Manual Training, Lyons Township High School, La Grange, Ill., and Instructor in Manual Training in the Wisconsin Highland Camp.

THE accompanying pictures show the character of the manual training work being done each summer in a boys' camp in Northern Wisconsin. Much material is obtained by the boys by stripping birch trees of the bark, from which some of the articles are made. Since this barking of a tree not only shortens its life but sometimes kills it, none are barked except those which are soon to be felled for lumber. We take the boys to a nearby logging camp where the timber is to be cut to get our material for manual training uses; or, we sometimes get good material from fallen trees and thick brush where cutting a few limbs does no injury but on the contrary helps the remaining growth.

The trees in the Wisconsin woods which furnish the most useful barks are the birch, maple, Norway pine and the white pine. Out of these we have made some very artistic birdhouses, waste paper baskets, picture frames, fern boxes, etc. One interested in pyrography may use the plain white birch bark to excellent advantage for burning. We made some very unique little souvenirs by burning mottoes, dates, etc. on placques, match holders, baskets and the like.

The tree we used for our round birdhouses is the arbor-vitae, meaning the tree of life and generally known as the white cedar. It is often found growing with the heart of the tree rotted away and the shell which is only about one and one-half inches thick is easily fashioned into these little houses. The largest of the birdhouses is made from maple twigs. Maple limbs work up well also in camp chairs and foot stools, and these with magazine racks of the birch limbs make good looking furniture for a summer cottage. The boys are interested in making small boats and for this purpose they use the Norway and white pine.

This kind of manual training has, besides the old arguments in favor of such work, two important points which commend it. First, such work is good and wholesome exercise. The boy is out in the open and learns to love nature. Second, the boy's independence, observation and ingenuity are developed in seeking and selecting his own materials merely from what he can find in the woods. Work of this nature could be done in any section where there is timber, as all parts of the country afford a variety of woods. And for the boys who wish to do things of a handicraft nature in the summer, few things could be found more pleasant.



A Few Picture Frames.

Machine Tool Equipment for Manual Training Schools

Wm. J. Sansom, Instructor of Mechanical Practice, University of Wisconsin

IT is said that some machine tool builders are advertising certain machines as being adapted to use in manual training schools and colleges, that are so out-of-date as to be practically obsolete, and that no student can profitably spend his time in learning their operation.

While it is admitted that the assertion is true to a certain extent, it is the claim of the writer that the average student will learn the fundamentals of machineshop work equally as well, and perhaps better, on the old style machine as on the modern heavy duty machine. It should be understood that a student usually spends but a very few hours each week on shop practice and can only expect to learn the rudiments of machine tool operation.

As an instance, modern engine lathes are equipped with rapid change gear devices for use in thread cutting, devices that are very valuable as time savers, but the student will not appreciate the reason for lifting a rocker gear to mesh with another gear numbered 1 and then meshing another gear with one numbered 12 if he wishes to cut a twelve-pitch thread, which is practically all that is required to prepare such a machine for thread cutting. If, however, he is taught to figure out the spindle to lead screw ratio and is then given the opportunity to select and place the necessary gears in position on the stud and and lead screw in the old fashioned way, he will clearly see the reason therefor and will benefit accordingly.

In the same way, he will learn the essentials of planer operation fully as well on a single cross head machine as on one having additional side heads.

A milling machine should most certainly be of the universal type, with indexing head to permit of the cutting of spirals, but other special equipment would be superfluous as also would a machine built extra heavy and rigid for heavy duty.

The instructor will also find that, from an economical viewpoint, by a judicious selection of machinery, thru elimination of extra and special equipment and the choosing of machinery adapted to the size of the exercises intended to be given, that he will be able to greatly reduce his expense in equipping the school.

Furthermore, it is not at all necessary for the student to use high speed cutting tools in his work; consequently the lighter type of machinery may be used to advantage and the question of power would not be a deciding factor in favor of the modern rigid machine.

On the other hand, in the purchasing of such tools one should, most certainly, be sure that the machines have the necessary improvements to insure the proper instruction in the work to be given.

The regular trade schools are confronted by a different situation.

Here the student spends eight hours a day thruout the term, right in the shop, with the exception of a short time in the lecture room, and leaves the institution a supposedly first-class mechanic with the intention of entering upon commercial work. The equipment should, therefore, be of the very latest type and the instruction given directly in line with high-grade production.

In planning the school equipment the following specifications and prices of machine tools and accessories will be found of value; the prices given are approximate only, manufacturers' prices not being uniform for the same sizes of machinery. The writer wishes to acknowledge the courtesy of Hill, Clarke & Company of Chicago, Illinois, in furnishing authoritative information on present prices of the machinery discussed in this article. It should be kept in mind that machine tool prices are abnormal at this time owing to the enormous demand for munitions and other war supplies. As to the possibility of lower prices after the war, one machinery expert remarked that "at the present time one man's guess is as good as another's."

Engine Lathe: 16″ swing over carriage. Length of bed 6′. Compound rest. Equipped with lead screw and gears for thread cutting and a belt drive for carriage feed. Cost, $600.00. A taper attachment, while not absolutely necessary, is a decided asset and would cost $60.00 additional.

Chuck: 12″ four jaw, independent, would cost $21.00. Chucks are classified mainly as follows: Independent type in which the jaws gripping the work move separately; Universal type having jaws moved simultaneously, and the Combination type the jaws of which may be moved separately or as a unit.

The Independent chuck is undoubtedly the best type for school use, as the student will gain more beneficial practice from its use than from the Universal type. While the Combination style of chuck may be used in the same way as the Independent type, the constant changing from the Independent to the Universal jaw movement will produce inaccuracy in the concentricity of the jaws so that occasional truing up, by grinding, would be necessary to keep the chuck in perfect condition for close concentric work. The Universal chuck is only intended for repetition work of circular or regular shapes having the same number of sides or multiples thereof as there are jaws in the chuck. For instance, a three-

jawed chuck would conveniently hold a triangular or hexagonal shape but would not be suitable for square shapes.

Milling Machine: If the plain type is desired, that is, a machine in which the table travels longitudinally *only* at right angles to the main spindle, a suitable size would be, longitudinal feed range 25″, cross feed range 8″ and a vertical feed range 18″ with automatic table and cross feed. Cost, $675.00.

A Universal machine permitting of the table being fed longitudinally at *other* than right angles to the main spindle, with automatic table and cross feed, would cost $750.00.

A universal indexing head and tailstock, a necessary adjunct of the universal machine, is used to obtain the accurate division of polygonal shapes and the dividing of circles. The cost for a 12½″ head as described would be $200.00. No other attachment would be absolutely necessary except a swivel vise which would cost $30.00.

Planer: Single head type 16″x16″x42″, that is, a machine having a capacity of 16″ between the housings, 16″ under the cross rail, and a 42″ stroke, would be large enough for the school and cost $800.00. However, should a larger size be desired a 24″x24″ x72″ can be purchased for $1,130.00.

Shaper: This machine would not be necessary unless a full equipment is desired, as the planer will teach the same principles as the shaper. The main difference in operation is that the work table travels on the planer while the tool is fixed, whereas on the shaper the work table is stationary and the tool travels. This machine of the size known as 14″ plain crank will cost $350.00.

Sensitive Drill Press: Of good design with ball bearings would cost $150.00.

Upright Drill Press: 20″ with power feed and back geared capable of drilling in the center of a 20″ circle would cost $100.00.

Universal Cylindrical Grinder: Capacity of 9″ swing over bed and a 24″ longitudinal feed, $650.00.

Tool and Reamer Grinder: Of first-class construction may be purchased for $300.00.

Disk Grinder: A machine carrying an 18″ abrasive disk would cost $250.00.

Power Hack Saw: Ordinary type, 4″ stroke, cost $20.00.

Grinder: Intended for sharpening lathe and planer tools, with a 12″ grinding wheel capacity may be purchased complete for $35.00. A wet grinder, of larger capacity, on which a stream of water is directed by means of a pump or other mechanical device while the grinding wheel is revolving, would cost up to $90.00.

The following summary of tools that may be considered for school equipment has been compiled with care and will enable the reader to form an accurate estimate of the total cost of an installation.

16″x16″ Standard Engine Lathe for thread cutting	$600.00
Taper attachment for above	60.00
12″ Four-jaw Independent Chuck	21.00
25″x8″x18″ Plain Milling Machine, table and cross feed automatic, no attachments	675.00
25″x8″x18″ Universal Milling Machine, table and cross feed automatic, no attachments	750.00
12″ Universal dividing head and tail stock for above	200.00
Swivel vise for above	30.00
16″x16″x42″ Planer with single cross head	800.00
24″x24″x72″ as above	1130.00
14″ Plain Crank Shaper	350.00
25″ Backgeared Crank Shaper	715.00
No. 10—11″x2⅜″ jaws Square Base Chuck for Planer	30.00
Sensitive Drill Press, single spindle, ball bearing	150.00
20″ Upright Drill Press, power feed, backgeared	100.00
9″x24″ Universal Cylindrical Grinder	650.00
Tool and Reamer Grinder	300.00
18″ Disk Grinder, plain	250.00
4″ stroke Power Hack Saw	20.00
Floor Grinder, 12″ wheel	35.00
Floor Grinder, wet, 24″ wheel	90.00
Bench Vise, 4″ jaw	5.00
10 H. P. Electric Motor	150.00
Shafting, Belts and Pulleys	150.00
Sufficient quantity of Hack Saw Blades and Frames	5.00
Files and File Handles	35.00
Cold Chisels, various shapes	10.00
Machinists' Hammers, weight 1½ lbs.	5.00
Tool Holders and square steel to fit, for use on lathes and planers	20.00
Milling Machine Cutters	25.00
Lubricating and Cutting Oils	5.00

A comparison between the individual motor drive and the line and countershaft driven by a single motor is a subject of interest to all who may have control of machinery.

The individual drive in which each machine has its own motor directly connected by chain, gear or belt is advantageous insofar as it eliminates the unsightly overhead shafts with the belting requiring constant attention; it avoids the changing of position of belting on cone pulleys to obtain changes of speeds; it is cleaner and less dangerous; it is more efficient, and as it is unnecessary to operate an entire line shaft if it is desired to operate only one particular machine, there is consequently a decrease in the amount of electricity used, altho the saving is not nearly as great as is popularly supposed. On the other hand these individual motors greatly increase the cost of the initial outlay for equipment, and as they are usually started and stopped by persons who really have only a slight knowledge of their care there is liable to be a resultant damage thru the blowing of fuses or the arcing of contacts on the rheostats; therefore it would be usually considered the better plan to adopt the line and countershaft with single motor drive in schools and to prohibit its operation to all but the instructor in charge.

Development of Water Color in Primary Grades

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(First Article)

TEACHERS of primary grades, and supervisors of art work in those grades, are not all agreed as to the value of water color painting as a means of expression during the first few years of school. Indeed there is a very wide variance of opinion. The fact that there is this variance of opinion goes to show that good and bad points in the handling of the medium have been found and these points—advantages or disadvantages—have given birth to beliefs which people interested in the work are cherishing.

Those teachers who are most pessimistic when the subject is considered see only a waste of time and energy—the children's and their own—and the development of many bad habits of work. Others contend that most of the efforts along this line are followed by results of unappreciable value because the medium is much beyond the ability of young children, and its technical properties are such as to make it impossible to have the work become an educative factor. Many complaints are made about the amount of time spent in preparation for a painting lesson and the added amount of time required to clear up when the lesson is finished, and this seems, to those who complain, a woeful waste of time and energy in view of the fact that results seem destined to be discouraging. To some extent there is foundation for the opinions enumerated in the preceding sentences, and while some of the fault may be in the medium itself, there is no doubt but that methods used in handling it are in some small way to blame for conditions.

In addition to those teachers who find fault with water color as a medium of expression and place the blame for poor results upon the medium itself, there are those who feel that this work is something to be taught by an artist or a special teacher. They consider the subject as special and much beyond them. Then, too, these same people consider the time to be spent in gaining a working knowledge of it too long and tedious. Everyone who is acquainted with school work knows that a teacher's life is a very full one and many demands are made upon her time, but there are big surprises and rich rewards in pleasure in store for the teachers of primary grades who have the determination and ambition to teach this subject as it should be handled. The road to be followed is not a rough one, a little vague perhaps at times, but at the end is to be found much comfort and this comfort comes from knowing how to do one's daily work well.

For teachers of the kinds suggested in the foregoing paragraphs there are two important things to do. First of all the state of mind must be right, and these people must decide that if water colors are to be used at all the results must be and *shall* be right insofar as existing conditions will permit. The proper frame of mind will work wonders here as it does elsewhere. This determination to produce good results must be followed by the determination to find ways of bringing color into the activities of little children in such ways as will lead to valuable results. It never will be found necessary to originate a love for color, as we are all born with that within us. Children need to know ways of applying love of color so that it will add something to their education and by so doing increase their pleasure and enrich their lives in general.

It is the purpose of the suggestions which are to follow to show, thru many reproduced examples of the work of children in the first three grades, that there is value in the medium in the hands of these young people. It will be seen that the medium is not beyond the grades mentioned in technical properties and that it furnishes opportunity for mental development thru observation and the skillful recording of these observations in color. It seems unnecessary to say anything of the joy to be found in the work, for we have all seen evidences of it even when children are allowed to "mess around," but there is a two-fold joy for children who reach the place where they handle color properly and it is hoped that these articles may be of some slight assistance in bringing about that condition.

"My children love to paint," said a First Grade teacher, "and I am very fond of the work myself. However, I always feel so helpless because I do not know how to help my people to progress. When my little people have been in school two months they have come to the place thru my efforts, and their own, where they are able to do some reading and know a little bit about number. When they have spent a year with me, they know more about reading and number. They are able to do some creditable writing and to construct with some degree of accuracy. It is easy for me to help the children in these subjects because the work is quite definite and I know just what steps to take to keep them growing a little stronger day by day. But this water color work! There is no beginning, no end, and I never know what to demand or expect and because of this, there is no growth."

There are many theorists who hold that any attempt at development of technique, if we call it so in the lower grades, is entirely out of place and does much toward stunting the originality and initiative of the child. In many cases there are people who feel

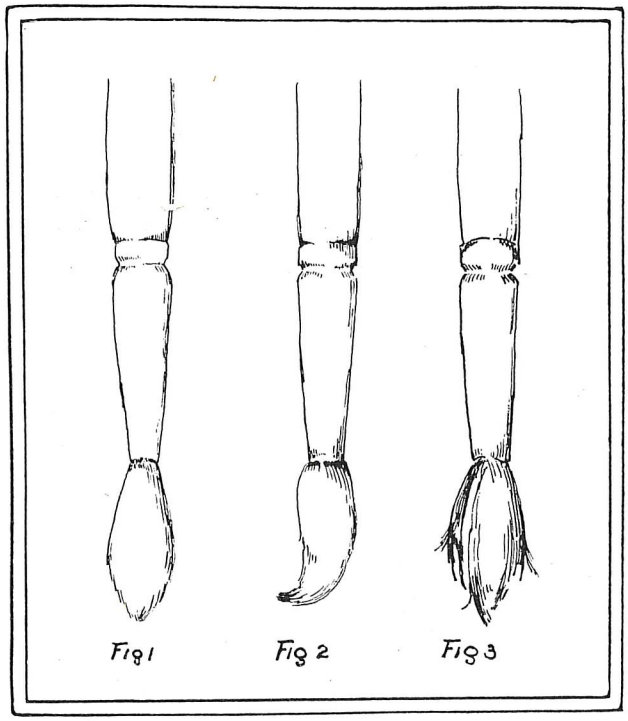


PLATE I.
Fig. 1 shows a brush in good condition.
Fig. 2 shows the result of cramping the brush.
Fig. 3 shows a brush that has been abused.

that children should not be allowed to write until they have gained control of the muscles, thereby gaining the skill necessary in developing good letter forms. This is done so that the visible expression of thought may conform to certain standards we have set up. It seems that the cry which the teacher referred to in the previous paragraph made is indicative of the fact that it is necessary in some respects to standardize our work in water color painting so that our teachers may know "what to do next" in the development of the subject. Not knowing "what to do next" is a condition which does much to keep our children doing approximately the same kind of work in this line as they progress thru the grades.

There are certain standards of methods of expression in drawing and painting even as they relate to the work of very young children. At the beginning these people have standards of their own which to them seem very satisfactory. It is necessary for us to set up new standards and give children ways of attaining these standards. Children find much joy in doing things in the proper way and this is a most desirable and helpful kind of joy to be developed.

The skillful teacher will lead children into the best ways of using water color thru suggestion and encouragement. Perhaps the greatest thing that a study of painting should do is to develop a love, however slight, for better things in color, and continual forcing will add nothing to this development. Demonstrate, suggest and lead all that you will, but often give children a chance to express themselves thru the medium. As far as possible, and much as possible, hold to what has been taught. Keep your children feeling that only the right way is their way. Commend and encourage much because thru these two actions great ambition is developed.

It seems only fair that after a child has worked a year in a subject that he should carry with him to the next grade some foundation for the development of the work to be done in that grade. In most subjects he does. However, there are many doubts as to whether or not he picks up and carries with him much that is valuable from the standpoint of power to express as he goes, for instance, from First to Second Grade. If the teacher allows the child to use paints freely and without teaching, he is apt to go to his next teacher with a very heavy load of bad habits. If this teacher does not know what to do the child goes on strengthening his old habits and collecting a few new ones. If the teacher has certain standards to which she feels she must bring her children there is little time in which to do this after the previously acquired bad habits have been eradicated.

The teacher of First Grade who starts and keeps her children in the right way of using water color is a true benefactress to all those teachers to whom her children may be assigned in years to come. She is laying a foundation for the growth of happiness for the child as he does the work of other grades, and she is keeping burdens and cares from descending upon the shoulders of those teachers who follow her.

The First Painting Lessons.

The field of color is a very large one, and as it relates to water color painting, is, in most cases, a very new one to children beginning school. It is quite possible to throw these young people into such work in a way that will leave them floundering about, unable to get their bearings and totally overcome by the magnitude of the problem set before them. On the other hand, we may introduce the subject by degrees, adding a little each day to what has previously been taught, leading our class of beginners on and on, until we have built up little by little an understanding and appreciation valuable in educational development. Along with this understanding

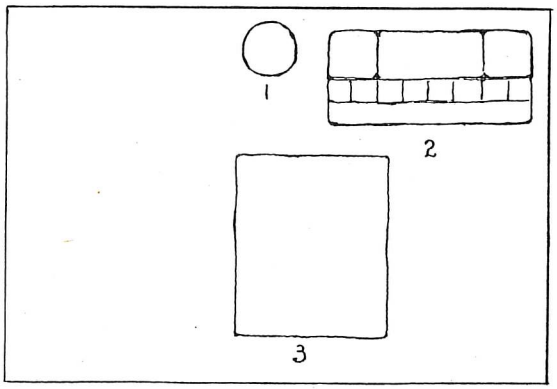


PLATE II.
Fig. 1 Water Pan. Fig. 2 Paint Box. Fig. 3 Paper.

and appreciation we have opportunity for helping the children to acquire some small amount of skill. Progress in this line of work is a matter of slow growth and we must be satisfied to begin at the bottom, leading our children carefully and wisely thru the series of necessary steps.

Keeping in mind the view which the preceding paragraph sets forth it seems advisable, when first introducing water colors, to work from objects which call for the use of only one of the primary colors—red and yellow being the most easily adaptable. Autumn months furnish much material suitable for the application of these colors. If, in some cases, the objects used are not identically the same in color as that in which we first paint them, we need not feel that we are not holding to the truth in expressing Nature. Beyond doubt, our colors are as close to the natural hue as the judgment and ability of the child can produce. To the child an apple, almost red, is a "red apple," and if he paints it as such, he expresses himself according to his own judgment. This theory holds good thru much of the beginning work. The aim is to keep the problem well within the ability, mental and physical, of the children to whom it is presented, and as the "doing" becomes a little easier, they are left free to see more and carry into execution what is seen.

Nothing will do more toward the development of good water color work in the lower grades than demonstration by the teacher. "Showing the way of doing things" will help a great deal. There is no reason for the timidity which many primary teachers possess when it comes to painting before their classes, because those who cannot paint well enough to demonstrate before inexperienced children are indeed very scarce. To be sure, the teacher should know the correct way of handling color before she attempts to show children how to do it. A little time, a little energy and the proper viewpoint will make it possible for any teacher to do this part of the work advantageously.

In many schools a certain amount of work in representation is done thru freehand cutting before color is taken up. This may serve to make children familiar with the shapes of fruits and vegetables which, later on are to be done in color. Children nearly always get better shape and size in cutting when the pieces of paper from which they are cutting suggest the size of the object to be represented. A paper nearly square, approximately $4\frac{1}{2}''$x$5\frac{1}{2}''$, will help the child in producing the proper size and shape of an apple, while a paper narrower and longer, 3″x8″, will do the same for his representation of the carrot. This is also true of painting and the teacher can do much for results by providing paper of the proper size. Thru this process, the children may, to a certain extent, be led away from following their inclination to make small drawings and paintings. Representing any object on a paper suitable in size is bringing a suggestion in composition before the children. Plate III shows paper cuttings illustrating the preceding points. Plate IV illustrates the same points in water color painting.

For our first lessons we might choose such a simple model as the apple. This fruit is quite simple in shape and coloring and is familiar to all children. Choose an apple which is wholly or nearly red and remove the stem, because this brings in a mixture of colors beyond the ability of those people just beginning the work.

It is characteristic of young children to totally disregard observation once they begin to draw or paint. For this reason all expected observing should be done as a class and developed largely thru conversational lessons. Talking to the children after painting is begun and having them stop work to look at the model is to be discouraged for more than one good reason. If the medium used is water color, it must be handled quickly and besides that the little people will feel that getting their color on paper is much more important than anything else which you may have to suggest. Do your talking, directing, and demonstrating before the children take up their brushes and when once they have started to paint, let them go on working out their own salvation to the greatest extent possible. Of course, the foregoing statements are not made with the intention of discouraging words of commendation, occasionally. Such words are needed and will carry many a disheartened youngster over shaky places.

Let the children decide which color to be found in the box will give the nearest to the color of the apple. Call attention to the shape of the sides, the base and top. Show the model chosen to the children in such a way as will prevent them from seeing the depressions to be found in the upper and lower parts.

The elimination of things which your striving children can not do, will do much toward simplifying the model, bringing it into the sphere of the capabilities of your class and will prevent vain efforts, trying to accomplish the impossible. Keep this in mind always and do what you can to make the problem to be presented one suited to the powers of the people with whom you are working.

When the small amount of observing that beginners will give to an object is over with, demonstrate, illustrating the different steps necessary in the development. This demonstration should be given at the front of the room and far enough to the side so that every child in the room may see what is being done. If the blackboards are made of slate a little paste at the top of the paper to be used will hold it in place on the board. Never use paste on boards made of other materials because when the paper is taken off, it will take some of the composi-

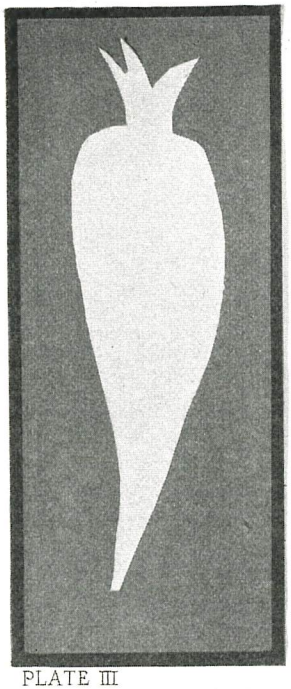


PLATE III

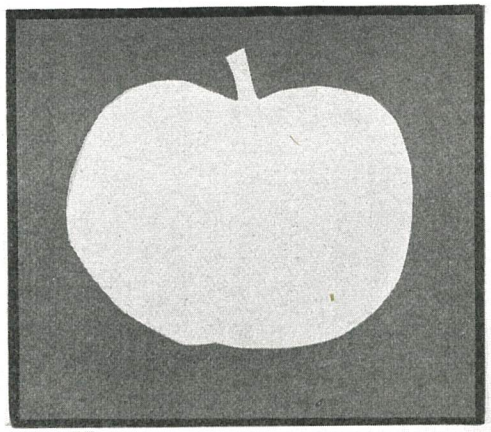


PLATE III

PLATE IV

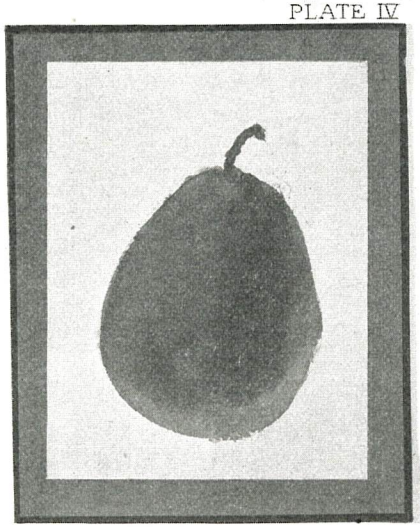


PLATE IV

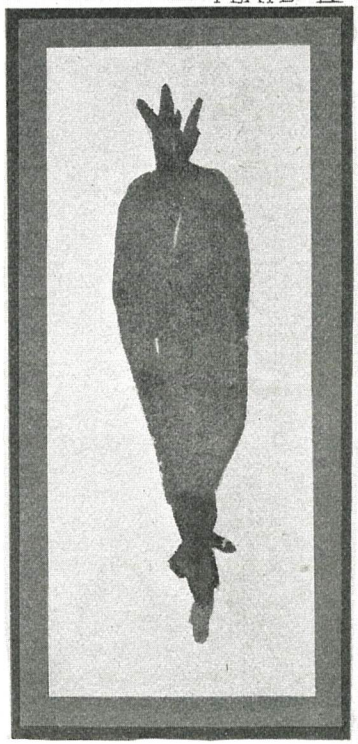


Plate III (apple). Size of paper suited to size of object represented in paper cutting.
Plate IV (pear). Size of paper suited to size of object represented in water color.

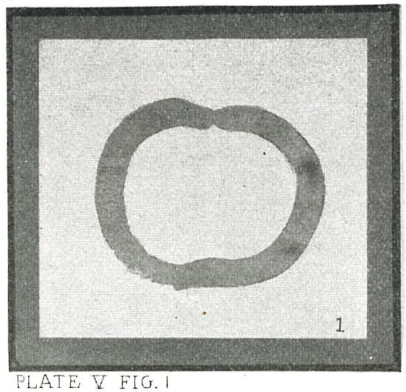


PLATE V FIG. 1

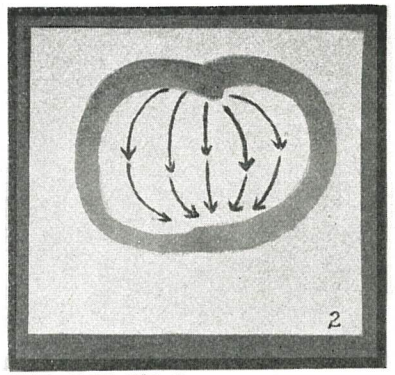


PLATE V FIG. 2

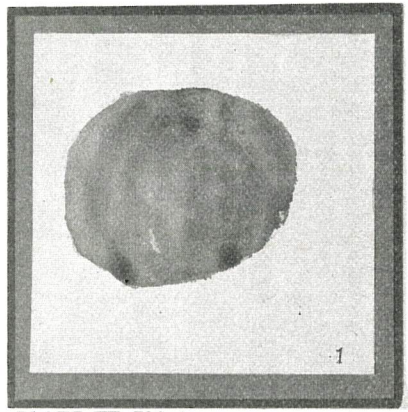


PLATE VII FIG. 1

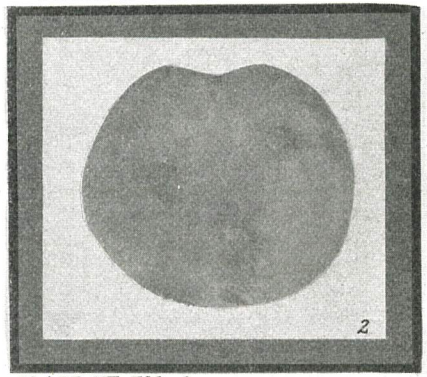


PLATE VII FIG. 2

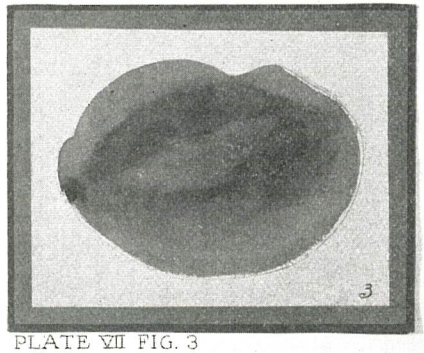


PLATE VII FIG. 3

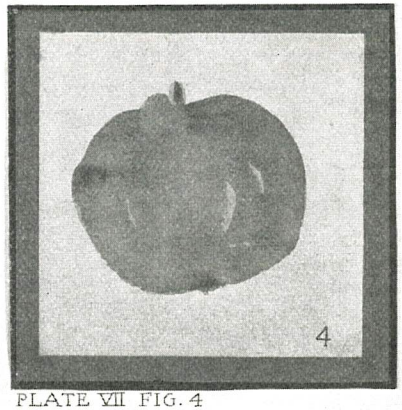


PLATE VII FIG. 4

Plate V, Fig. 1—Shows wide curving lines which determine the shape of apples.
Plate V, Fig. 2—The arrows show what directions the strokes should take when filling the center.
Plate VII, Fig. 1—Examples representative of the work of first-grade children.

tion with it. A drawing board may be placed on the chalk ledge, and the paper fastened to this. A heavy mounting card may be used in the same way or it may be suspended from the moulding at the top of the blackboard. The resourceful teacher will think of many other ways of doing this. It is only essential that both of her hands be free to handle her equipment and that every child may see what she does.

In following one method of value the shape of the apple may first be put on the paper with clear water. While doing this show the children how to hold the brush—much as you hold your pen or pencil, with the fingers far enough up on the handle to keep them off of the tin binding the hair and wood together. Holding the brush this way will permit greater freedom in its handling. Show how to fill the brush with water by putting it gently in the water pan. Prevent, as much as possible, the habit of pushing the brush against the bottom of the pan—one which young children easily develop. Swing the brush, well filled with water from center of top of the apple shape, down around the side and over to the center of the base, completing this much with one stroke. Fill the brush with water again and complete the other half of the outline in the same way. See Fig. 1, Plate V. As you make these strokes with your brush call the attention of the children to the amount of work which the brush did at one time. Much good comes thru encouraging the correct use of the brush and one should always preach that it should be made to do as much work as possible each time that it is put on paper. Never use two strokes when one will do. More will be said about brush handling later.

When the sides of the apple are finished the center may be put in with strokes following in direction those which form the sides, working from the top down, as the arrows in Fig. 2, Plate V suggest. It may seem quite unnecessary to watch the strokes so carefully when only water is used, but no opportunity to develop brush handling should be neglected.

When this step is finished show the children how to charge the brush with water and take up the paint by passing the brush over the surface of the cake of red—see Plate VI. Then using strokes, such as were used in doing the shape in water, paint in the color.

After your demonstration, allow the class to paint, using as much of your method as they have been able to grasp. How many will use the suggested method, and how much of it will little first-grade people grasp? The question is hard to answer —much depends on you and the children. But if, after your first struggle, you find that only a few have shown that they have grasped the directions and carried them out, do not despair. The second struggle will carry your method to a few more and a third to still others and perseverance will bring its reward. Habit forming is part of the first-grade teacher's work and habits come thru repetition. Do what you can to have the repetition of the right kind so that the habits may be right. Plate VII shows the kind of work which may be expected from the first-grade children.

Now, the painting is finished and the papers must be put aside to dry so that the desks may be cleared and used for other activities. Perhaps the window ledge in your room is wide. Have the children take their papers and march around the room, leaving them on the window ledge as they pass. If the papers are not so wet that the color will run when they are placed erect, the children may stand them up on the chalk ledge. Your little people will like this exhibition of the results of their efforts because it gives an opportunity for every one to see what the class has done. A few minutes spent in commenting on the work, drawing the attention of the class to the better ones, and in an encouraging way telling how some of the poorer ones may be remedied, is time well spent and will go toward helping the work of the lesson to follow.

Your responsibility and the children's in this lesson cannot be cast off until the brushes are well cleaned, shaped and put away safely in their places in the boxes. After such a lesson as this, the chances are that there will be little need of cleaning colors, but if paint has been dropped accidentally on any part of the box, it should be removed. We cannot begin too early to instill the habit of keeping a clean color box.

It may seem that much time and space have been taken to tell how to paint an apple. There is so much in the telling which applies to painting in general that, without doubt, neither the time nor space has been wasted. These first steps or processes are important ones and should be carried along and strengthened as the children work with other fruits, vegetables and flowers. If you are a teacher whose duty it is to introduce young children for the first time to color, omit reading some other chapter

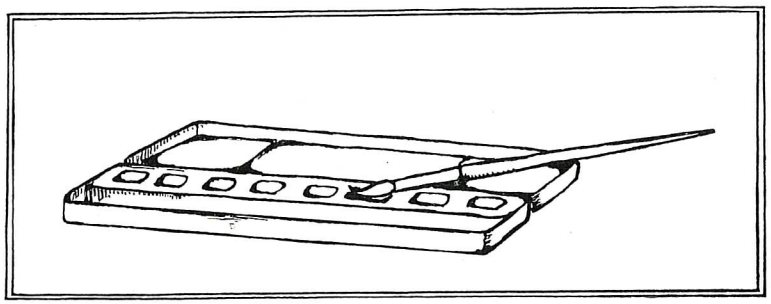
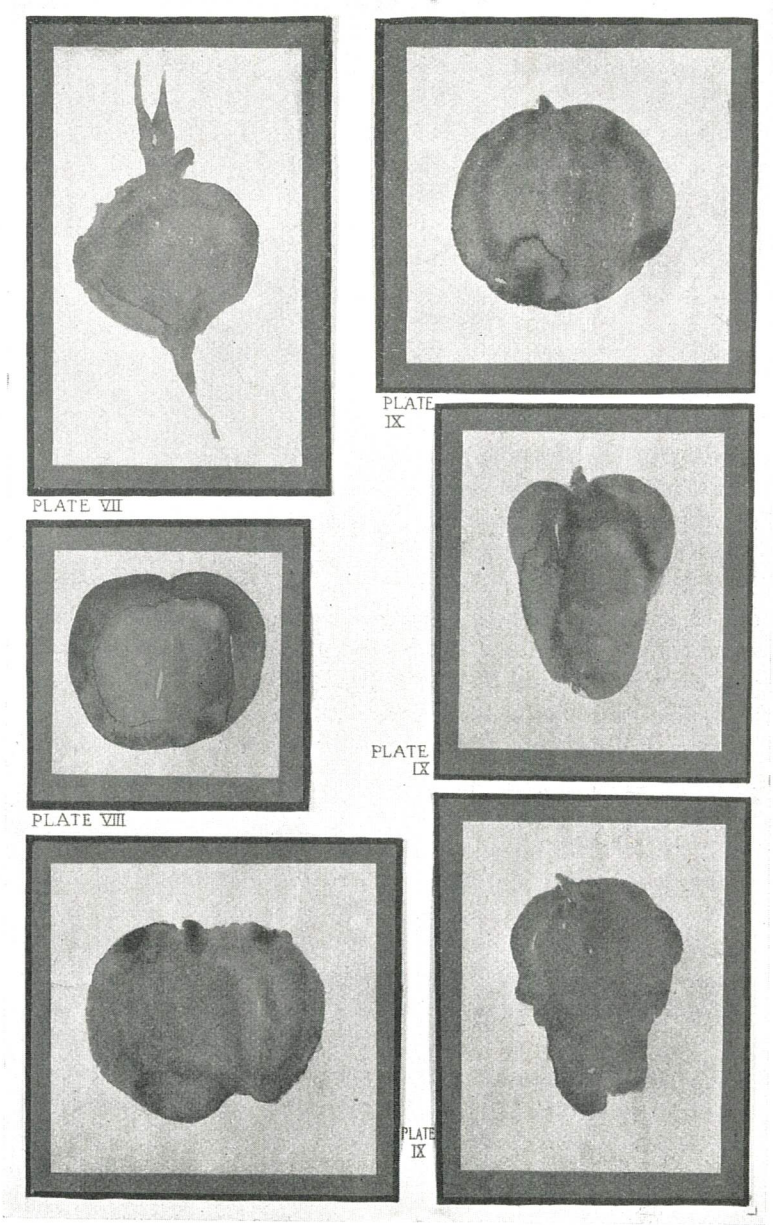


Plate VI—The brush should be moved across the cake of color from right to left.

if you will, but read this one more times than one if necessary, because much of your success depends on just such points as are given here.

When children have acquired the habit of working with well filled brushes, and plenty of water, it is unnecessary to use the method suggested in previous paragraphs. Instead show the children that with brushes well filled with water and color, the same bring better and deeper color than the first method, but children need to have greater skill in brush handling and some small amount of knowledge of the properties of the medium which they are attempting to handle, before taking it up.

Other fruits and vegetables—pears, tomatoes, red peppers, beets, etc., may be painted in the ways suggested for painting the apple. In every case



Plates VII, VIII, IX.

strokes may be used in painting the shape directly on the dry paper. When using this method very rapid work should be encouraged. If the first two strokes which determine the shape of the fruit are allowed to dry, the color put on the succeeding strokes will not flow as it should and hard lines will be the result; and these are quite objectionable. See Plate VIII. The method suggested here is apt to have the children observe closely the general contour of whatever is to be painted and show this in as few strokes as possible. Indicating the general outline with strokes of the dry brush will help fix the shape in mind before the children begin to paint. The ability to catch differences in growth and show them with a few strokes should be developed to the fullest extent possible, and when once developed will be

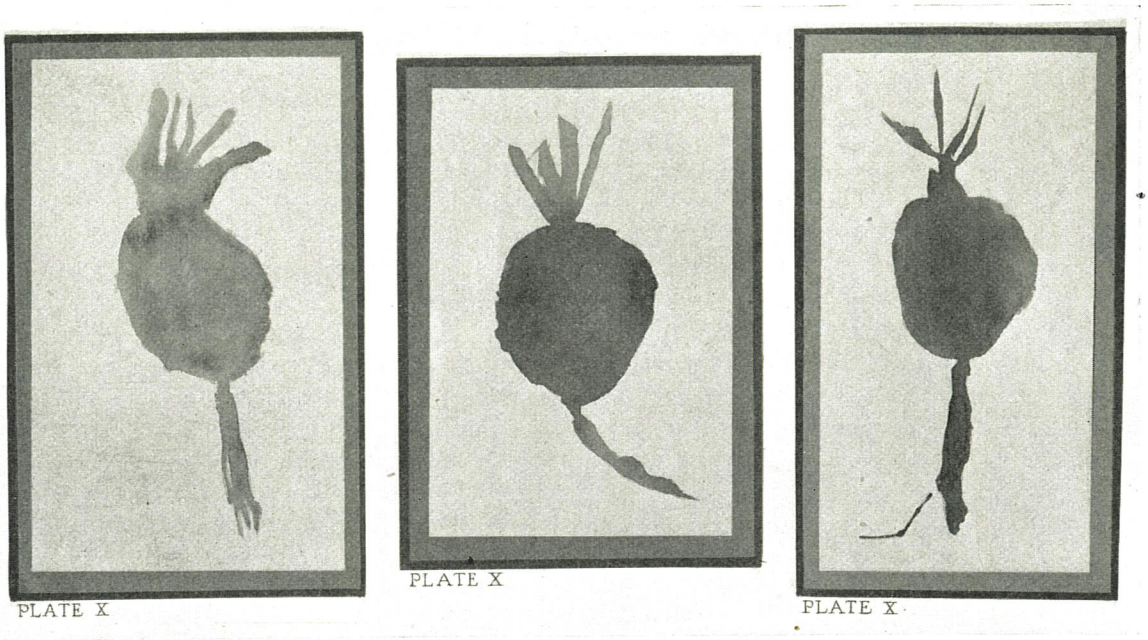


Plate X.

a source of much pleasant satisfaction to children and teachers. Plates IX and X show the reproduced work of children of the first grade.

Upon viewing the reproductions accompanying this discussion perhaps there will be some who will feel that the paintings from which they were taken would have been much more attractive if a bit of branch, a few leaves or something to give variety in color had been added. Such a feeling is indeed well founded and opportunity for adding such touches as those suggested should come, and quite early in the development. The "vocabulary" in painting must be built up slowly here just as it is in language and the mastery of this "vocabulary" is necessarily a very slow development. The bit of branch, the leaves and the other additional attractions will come and the children should be prepared as far as possible for their coming. The experience gained in handling color and the brush thru exercises suggested here will help give the children this necessary preparation. If you would have success avoid loading young minds and hands with too many points to be gained in one lesson. Go slowly and the development of skill on the part of your little people will make up for any lack of speed.

Continued effort on the teacher's part to instil correct habits of work will do much toward preventing children's acquiring wrong habits. This is a big task for you, Primary Teacher, because many, many times the inherent enthusiasm and childish ambition will seem to outweigh your efforts. But in the end the long and careful developing and watching will be rewarded.

THE real difference between those who succeed and those who don't is, the one thinks he can, the other thinks he cannot. The one discovers himself, the other doesn't. The one learns that he can do things, and the idea arouses, thrills, inspires him; the other thinks that all the great things were intended for someone else, so he misses the great experience, the great trials, and the great rewards. —*George H. Knox.*

A Cottage Built by Public School Pupils

Charles G. Wheeler, Topsham, Me.

THIS cottage has been built by pupils of Topsham, a small town in Maine. Topsham adjoins Brunswick—a well-known educational centre—where the Grammar-school boys recently built a workshop for school use. The domestic science classes in Topsham having been obliged to use unsuitable quarters in a cellar, the problem of building a cottage for this department was laid before the boys and the work was readily undertaken by them.

This building, begun two years ago, is now in regular use by the girls' classes, and gives entire satisfaction. The work has been done wholly (with the exception of the chimney) by Grammar-school boys of the sixth, seventh, eighth and ninth grades, with some voluntary assistance from quite a number of High-school pupils. These boys were untrained in building operations, altho some had practiced with the common woodworking tools in the school shop.

The dimensions of the building are 18 feet by 30 feet, with an ell or "lean-to" 5 feet by 30 feet. This space contains a small entrance-hall, a dining-room, a kitchen and a pantry. The dining-room, with a fireplace, is on the east side, and the large kitchen or workroom on the west side contains long work tables and range. The pantry is in the ell on the north side, and contains shelves, cupboards, drawers, and sink. The arrangement of the kitchen and pantry, which purposely are not separated, is planned to save steps and at the same time allow the teacher to be in touch with everything that is being done. The plans were much helped by the expert advice of the instructor in domestic science, Miss Mary S. Byrne. Over the front door is a trellis to be covered with vines. At the rear door is a platform.

The general process of construction was that in common use for such structures. A brief outline is given merely to call attention to the variety of processes gone thru by these boys. After making rough preliminary sketches (plan and elevations), a trial model was made of pasteboard on a scale of one-half inch to the foot. This was altered and rebuilt until the proportions were satisfactory. The working drawings,—plan, elevations, and details—were then made. This matter of making a model can well be emphasized. Altho a familiar process with the better class of architects, the ordinary builder rarely makes a preliminary model. It requires highly trained faculties, however, to visualize the actual appearance of a structure from plans and elevations alone.

Next, the sill dimensions were laid out on the ground, using the usual "batter-boards" and cords to locate the corners. It is wise to see that the diagonals are equal, and that they do not depend entirely on a square at the corners. The corners having been determined, post holes four feet deep were dug at all angles and at intervals of eight or ten feet wherever the sills or cross-sills would otherwise be unsupported. Cedar posts were then firmly tamped in place and levelled. Concrete posts would have been better, except for the difference in cost, and a continuous concrete foundation better still. The sills (6 inches by 6 inches) were then halved at the corners and spiked in place. The cross-sills were gained into the main sills. In placing the sills a mason's square was used and the diagonals were also made equal. In leveling the sills an accurate straight-edge was placed under the level to counteract any inequalities in the timber. After the sills were spiked in place, a large hole was dug to a depth below the frost line for the concrete base of the chimney and fireplace. The corner posts (4 inches by 4 inches) were next set up and braced. Much care was taken to get these as plumb as possible, using a straight-edge between each post and the plumb, and also to see that the posts "lined up" with each other.

The floor beams (2 inches by 8 inches) were then laid on the sills and spiked, the ends having first been "sized" to equal width. These beams were bridged in the centre. The under floor, which is best laid diagonally, was then nailed every three inches. The studding (2 inches by 4 inches and 4 inches by 4 inches at each side of door and window

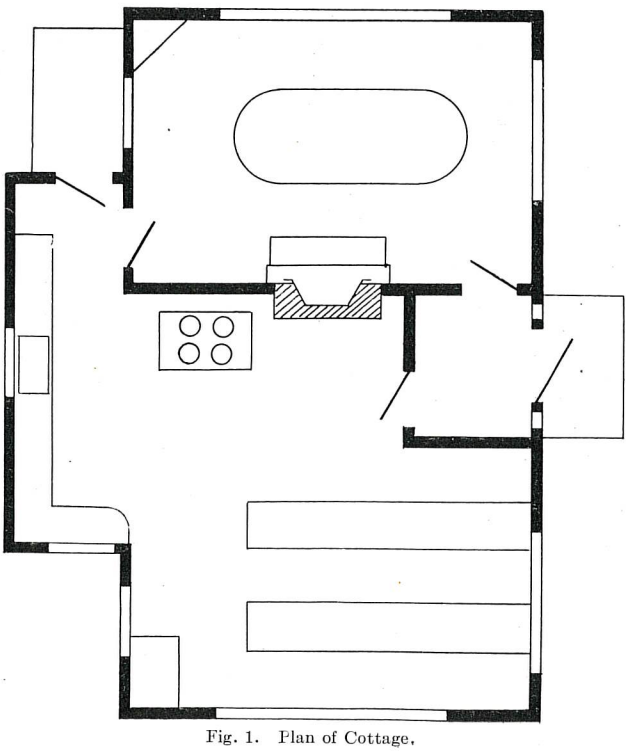


Fig. 1. Plan of Cottage.

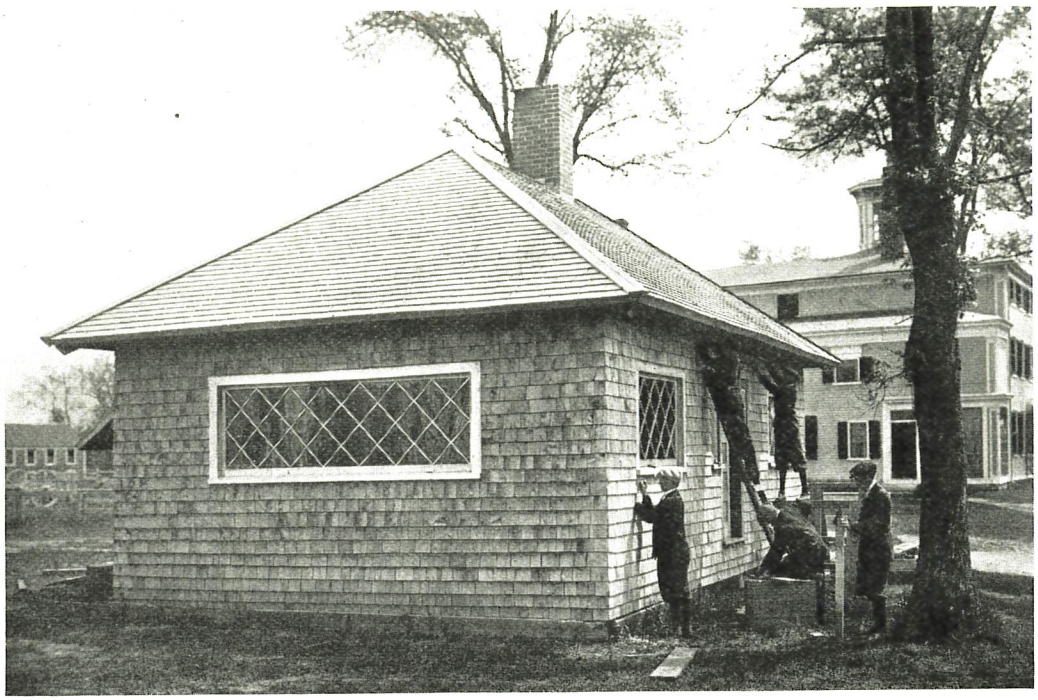


Fig. 2. Boys Putting Finishing Touches on Cottage.

openings) were next set up and aligned, and the lower plates (2 inches by 4 inches) spiked on top. The headers for door and window openings were then fitted. The long windows at each end of the building required trussing above (Fig. 3) to prevent sagging under the pressure of the roof.

The partition studding were next set up, and the outside walls boarded, after which the upper plates (2 inches by 4 inches) and the ceiling beams (4 inches by 4 inches) were put in place, the latter being halved at the ends. These ceiling beams support no weight but their own and that of the wallboard ceiling. All of the studding for the partitions, like that in the outer walls, rest upon the sills or cross sills, thus preventing the unequal settling which so often results from the modern easy, but unscientific, method of resting partitions on the floor.

Boards temporarily laid on the ceiling-beams gave standing places for putting up the roof timbers. The fitting of the rafters was laid out in the common way with the steel square. These timbers were put up by the larger boys. Next, the outer boarding was carried up between the rafters, because of the difficulty of doing this after boarding the roof. The roof boards were then put on, nailed every three inches, and headers fitted to form an opening for the chimney.

Meanwhile some of the boys had made the foundation for the chimney with concrete and such stones as were available, and the chimney was then built by a mason. The mason was employed to save delay from having the boys carrying on the chimney work in connection with the rest, for they could have built an excellent chimney of concrete lined with flue tile.

The roof shingles were laid 4 inches to the weather. After the outer walls had been covered with sheathing-paper, the door and window frames and casings were put in place and immediately painted. Extra paper was put on under the casings. The glazed sash and the doors were bought, of course, but the casings and frames were made by the boys. The outer walls were next shingled, 5 inches to the weather.

The inside walls were covered with wallboard, the joints being so arranged as to be covered by the wood finish. The wallboard (previously painted) for the ceiling was laid directly on top of the ceiling-beams, the latter having first been stained. The span between the ceiling beams was intentionally short to prevent sagging of the wallboard. The stiffest form of wallboard obtainable was used for the ceiling, and no sagging has occurred. The walls were painted with washable paint, and the interior finish fitted, stained, and nailed in place. By this process much daubing and overlapping of the colors was avoided. The interior finish—Carolina pine—was stained a rather dark brown ("English oak") and the walls painted a buff tint, the ceilings being cream white. The upper flooring was next laid—matched spruce in the kitchen (to be covered with linoleum) and hard wood (maple) in the hall and dining-room. The hard wood floors were stained and finished with repeated coats of linseed oil and turpentine in equal parts, as this treatment applied at frequent intervals gives suitable finish for a floor to be subjected to rough usage. The long windows

at each end of the building do not open, on account of their size. The others swing open from top or bottom and afford ample ventilation. A trap door gives access to the loft overhead.

The cost of the materials was the only expense incurred in building this cottage, except for the chimney, and the bills have all been paid from the regular appropriation for industrial arts. That is, the building has cost the town nothing outside of the sum which might otherwise have been spent in the manufacture of the miscellaneous collection of articles often turned out in manual training departments. These boys have thus, at no increased cost to the town, provided a substantial and much-needed school building, good for many years of service, and have gained much valuable knowledge and experience in so doing

Of course, extreme accuracy and a high degree of technical exactness can not be expected of grammar-school boys who are learning, or of any beginners, therefore imperfections can be found in the minor details of the work, as in all school work, but this cottage is thoroly built, neatly and attractively finished.

Such work is best done, obviously, by pupils who have had some practice in the use of tools, as this saves time and avoids confusion in teaching the simple operations like sawing, planing, use of the square, etc., while the work is going on; but it is not actually necessary that any of the boys should have had previous experience, provided the classes are small. If the pupils are as mature as high school boys and have had previous experience with wood-working tools, larger classes can be handled than if the boys are young and inexperienced. In the latter case, where each operation has to be explained as it occurs and the boys can not all be doing the same thing or working in the same place, small classes are necessary, for it is physically, if not mentally, impossible for one instructor to attend to so many

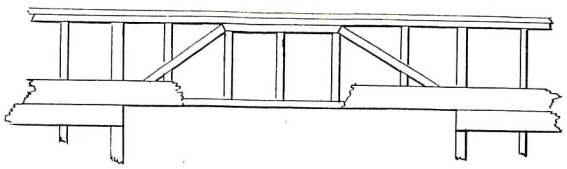


Fig. 3. Truss above Windows.

things at once. If the school requirements necessitate large classes, probably the best way is to have one or two foremen chosen from the boys, and to train these foremen privately in the operations they are to supervise, thus leaving the instructor free to oversee the whole work.

Perhaps the greatest difficulty the instructor has to contend with in such work is the unequal mechanical ability of the various pupils. Where each is doing individual work, as in much of the common shopwork in schools, the spoiling of the work of one pupil is more or less a personal matter, for the good work of another pupil is not spoiled thereby. But where all are working on the same building, errors on the part of one boy may seriously injure the whole result; therefore the work must be so planned and assigned that each may have tasks suited to his aptitude. At the same time all must be kept busy and each have a fair chance. This requires considerable planning, but it can be done. Construction of this kind can not be rushed. The natural tendency of boys is to hurry each operation in order to get it done, and if they get the idea that they are to rush the work the result will be disastrous.

Constructing buildings of various kinds is particularly good work for rural districts. Without a liberal and broad-minded school board and superintendent, projects of this kind can not well be undertaken. Given this requisite, the pupils of even smaller communities than Topsham can do such work, if properly instructed and directed, with advantage to themselves and to the community.

MEANTIME observe that this question of ornamental or architectural art does not mean, as perhaps most people think it does, whether or not a certain amount of ornament or elegance shall be plastered on to a helpless, lifeless article of daily use...a house, a cup, a spoon, or what not. The chest and the cup, the house or what not, may be as simple or as rude as you please, or as devoid of what is usually called ornament; but done in the spirit I have told you of, they will inevitably be works of art. —*William Morris.*

INDUSTRIAL WORK IN THE RURAL SCHOOLS OF COOK COUNTY, ILLINOIS

Herman J. Barber, Chicago

A PERSON wishing to make an investigation of industrial work in rural schools would not, as a rule, choose the county containing the second largest city in the United States; yet in a one-week's investigation of the rural schools of Cook County, Illinois, may be seen, perhaps, the most comprehensive scheme of practical work in rural schools in this country.

In the public schools of Cook County outside of Chicago there are 49,500 pupils according to the latest school census. In the county there are 106 one-room schools. In order to properly supervise and direct the work of the rural schools, the county superintendent has divided the county into five districts, each in charge of an assistant with the title of "the country life director," having three assistants.

The "country life directors" have organized in each school district, farm clubs and nearly all the boys and girls old enough to do such work, which, generally speaking, means all above the primary grades, are members of these clubs. Each boy in the club is expected to cultivate a plot of ground—the standard plot being one-tenth of an acre. Many girls also have plots of ground on which they raise fruit and vegetables which are canned and sold by them.

The work of these farm and canning clubs is considered a part of the regular school work and every pupil is visited frequently during the summer by either a "country life director" or one of his assistants, who makes suggestions and gives any desired help or instruction.

This farm club work does not in any way detract from or take the time of "regular" work of the schools, but on the contrary serves to vitalize the other subjects taught in the school. Compositions are written descriptive of the club work and each pupil is expected to keep an accurate account of all money spent in raising his crop and after making allowances for time spent, rental of ground, etc., to show the amount of profit in his project. In addition to its being excellent training for the boy, the work serves to interest parents in the work of the school and to lead them to support their schools more generously.

In the fall pupils are taught to select the corn which will make the best seed, and to hang it up in order to properly harden and preserve it thru the winter. Picture No. 1 shows the pupils hanging corn which they have selected for seed. Each ear is marked and a record is kept.

1—Lesson on hanging Seed Corn. Pupils of District 141. 2—Lesson in placing Rag Dolls in Pail for Germination. District 141. 3—Pupils of Morton Grove School, District 70, Cook County Testing Seed Corn. 4—Reading Results of Germination Box Test, District 70.

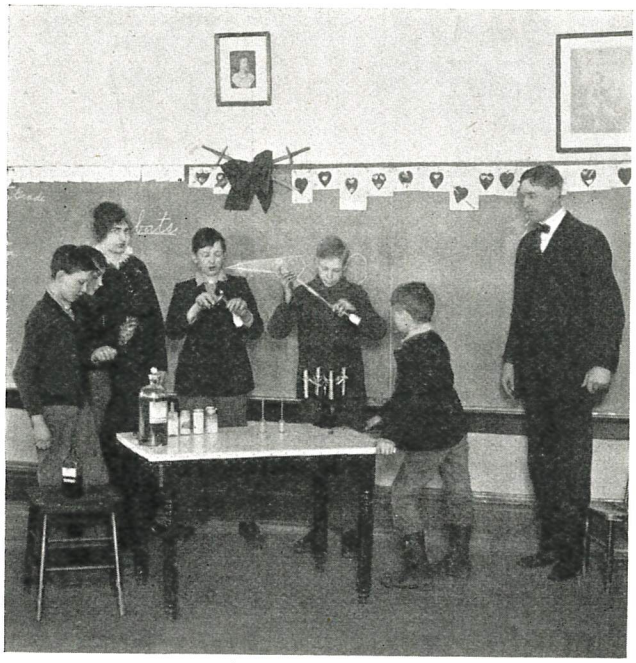


Illustration No. 5—Testing Milk.

Illustration No. 2 shows pupils testing seed corn in the spring by aid of the "rag doll." These "rag dolls" with complete directions for their use may be secured free of charge from the International Harvester Company.

When the seed has been carefully placed in the "rag doll," it is moistened and put away for germinating in a pail. See illustration No. 2. Later the seed is examined and the percentage of seed which has germinated is noted. Those ears of corn from which the seed shows the highest percentage of germination are recommended for planting.

Illustration No. 4 shows the pupils reading results of a germinating box test.

In illustration No. 5 a group of boys is shown making a fat test with a Babcock milk tester. These testers can be purchased for about $50, and the expenditure is more than justified by the results shown in the improvement of dairy herds of the district. By weighing samples of the milk of each cow each day, and testing them for butter fat, the boys easily determine the value of each cow for dairy purposes.

Cook County is no exception to the general rule, in that its country schools are taught by teachers a majority of whom are women who have secured their training in city schools. It has, therefore, been no small task for "country life directors" to enlist the interests of the teachers in work of this character. Illustration No. 6 shows classes of teachers in the county superintendent's office being taught how to conduct work of this character.

Illustration No. 6—"Teaching the Teachers" Canning in Superintendent's Office.

When work of this character becomes more general in the rural schools of the United States, we will no longer hear the complaint that boys and girls are being educated away from the farm. Boys and girls who have been taught the principles underlying farming, will have an added respect for it and will not be anxious to leave it for city occupations.

THE very producer, the designer and the craftsman, too, has been lost sight of, and his personality submerged in in that of a business firm, so that we have reached the *reductio ad absurdum* of an impersonal artist or craftsman trying to produce things of beauty for an impersonal and unknown public—a purely conjectural matter from first to last.

—*Walter Crane.*

A COPPER LAMP

Leon Loyal Winslow, State Normal College, Bowling Green, Ohio

METALWORKING which has to do not only with the making of articles from copper, but with the making of beautiful copper articles is doubly desirable, as taste for beautiful metal things is being gradually developed while the student works. He learns to choose beautiful things; he learns to appreciate workmanship, to proportion parts well, to properly emphasize constructive elements in his own work, and to provide for beautiful color harmonies in his work. Thru the use of both metal and glass, many beautiful color schemes may be worked out. In the lamp shown in Figure 1, the copper was colored chemically. A delicate green resulted, contrasting well with the darker green of the stained glass. These hues prevail thruout, with the exception of the square window in the top and the smaller ones, also square, in the corners of the shade. The large window is of an amber color; the smaller ones, ruby.

The designing and constructing of a lamp of this kind when undertaken simply, is not difficult. The student starts out with two ideals definitely in mind. The lamp must satisfy the demands made upon it by utility; it must also justify itself from the standpoint of beauty. The essential parts of a lamp of this type are the base, the upright part, and the shade. The student may represent these parts on a piece of paper graphically by three large spaces, which he is careful to so proportion that they may be of unequal size and shape, and give a satisfying or beautiful result, Fig. 2.

As the lamp must rest firmly wherever it is to be placed, he designs the lower shape in such a way that it appears to support the others. In the three shapes already drawn there are vertical, horizontal, and oblique lines, all of which may be regarded as lines of construction. If these lines be repeated the apparent strength is greatly increased. In other words the shapes of the parts will be emphasized and each opening will look more like what it is intended to be, i. e., a window. Thus the window frames are formed by the drawing of lines within each shape, parallel to the boundary lines already drawn. These lines are placed one-half inch inside the large shapes in order that plenty of metal may be allowed for fastening the parts together. The large window spaces may now be divided to form smaller ones.

Now comes the opportunity for decoration. The unequal division of spaces, and the repeating of construction lines, must continually be kept in mind. The student must think of his design as a unit; each window, tho complete in itself, must also be considered as a small part contributing to the whole, Fig. 1.

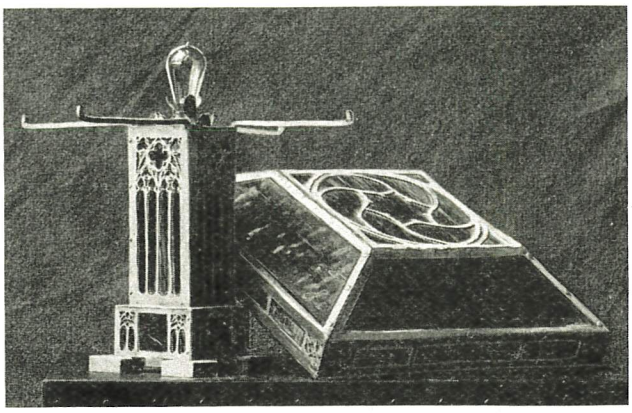


Fig. 1.

Stock for the several parts is now cut from a sheet of gage No. 20 sheet copper. Each piece is now worked out accurately to squareness and exact size. The windows are located and the decorative designs transferred to the metal by the use of carbon paper. In all places where a portion is to be cut out, a small hole is drilled to receive the saw. After sawing and finishing with a file, the sheets of metal are placed in a vise between two pieces of hard wood, in which position they are folded with a mallet. Large blocks of hard wood are then cut to the inside dimensions of the base and upright parts, and the final truing is done over these.

The shade, being in five parts, is not assembled in this way. Three one-eighth-inch holes are drilled in each oblique lap and three in each vertical lap. The sides of the shade are then fastened together with button-head copper rivets one-quarter inch long with shank diameter of one-eighth inch. The laps of the square top of the shade are then riveted in like manner (on the inside) to the top of the oblique sides. In Figure 1 these parts are shown united with hard solder, a more difficult process, but one that answers the purpose no better than riveting. Because of the thinness of the copper and the size of the shade, there should be some kind of reinforcement. In the illustration, two thicknesses of copper were soldered to the lower edges of the shade for this purpose. But here, too, soldering may be avoided by the use of a square copper rod one-quarter inch in section which, bent to conform to the shape of the shade, is riveted to its inside edge. The rivets used here are three-eighths inch in length.

The upright part of the lamp is now put together, and four rods, one-quarter inch square in section, are prepared to support the shade. Each is held in place by three-eighths inch rivets as before. The

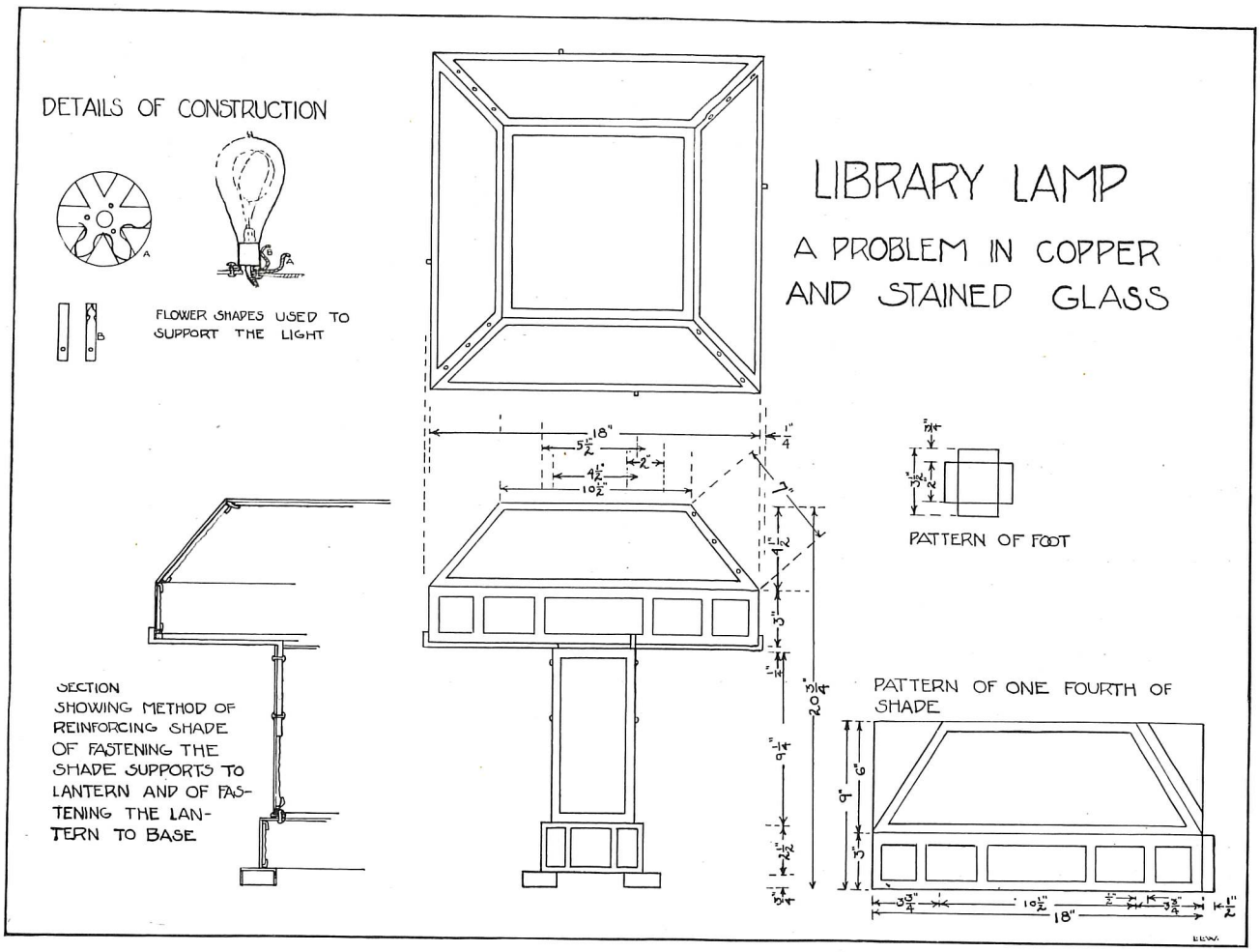


Fig. 2.

top of the upright part is then soldered in place. Upon this a support for the incandescent bulb is riveted. A one-quarter-inch hole is drilled thru the center of the top and bulb support, to receive the electric wire. The base of the lamp is assembled in the same manner as the upright part. Square copper rods, to which both parts are riveted, hold them together. The four legs beneath the base are little boxes cut out, formed over blocks of wood and hard soldered together and to the base.

The glass is held in place by little clips of metal which are soft soldered to the inside edges of the various parts. All superfluous solder is now scraped off, and the entire frame is rubbed clean with fine emery cloth. The frame is then put in the pickle where all stains are removed. The metal is now ready for coloring. The green color is produced by applying vinegar containing in solution blue vitriol and common salt, equal parts of each, as much as the vinegar will dissolve. When the metal is placed in the sun a poisonous green powder is formed on the surface, which may be preserved by a coat of banana oil. Samples of stained glass may now be procured and a successful color scheme determined. The student should provide for one general or dominant color, enhanced by small accents of more brilliant color.

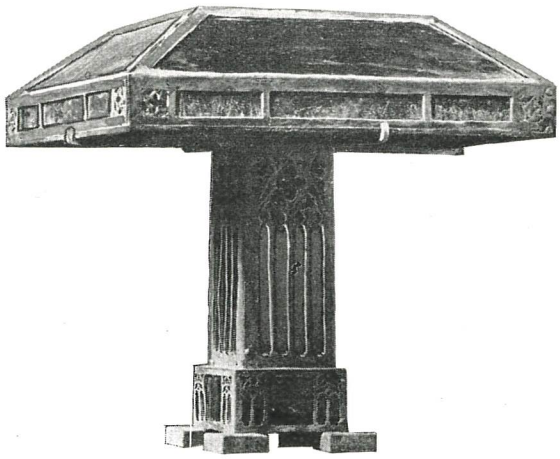


Fig. 3. The Completed Lamp.

FARM SHOP PROBLEMS.

Louis M. Roehl, Wauwatosa, Wis.

OATS SPROUTER.

Material Required.

Lumber:

1 piece 2″x4″x10′0″ white pine, cypress, fir.
1 piece 2″x4″x12′0″ white pine, cypress, fir.
2 pieces 1″x8″x12′0″ white pine, cypress, fir.
2 pieces $\frac{1}{2}$″x8″x12′0″ white pine, cypress, fir.

Hardware:

16 flat head bright wood screws 3″ No. 14.
16 flat head bright wood screws $1\frac{1}{4}$″ No. 9.
30 flat head bright wood screws $1\frac{1}{4}$″ No. 7.
30 lbs. 6d common nails.

Stock Bill.

Pieces	Dimensions	Use
4	$1\frac{3}{4}$″x$3\frac{1}{2}$″x4′0″	Posts
4	$1\frac{3}{4}$″x$3\frac{1}{2}$″x$16\frac{3}{4}$″	Cross bars
4	$\frac{3}{4}$″x$3\frac{1}{2}$″x7″	Lower braces
4	$\frac{3}{4}$″x$3\frac{1}{2}$″x3″	Upper braces
10	$\frac{3}{4}$″x$\frac{3}{4}$″x2′3″	Rests for flats
10	$\frac{3}{4}$″x$1\frac{1}{2}$″x20″	Guides for flats
10	$\frac{3}{4}$″x3″x2′3″	Sides of flats
10	$\frac{3}{4}$″x3″x16″	Ends of flats
10	$\frac{1}{2}$″x$7\frac{1}{8}$″x1′$1\frac{1}{2}$″	Bottoms of flats

Directions.

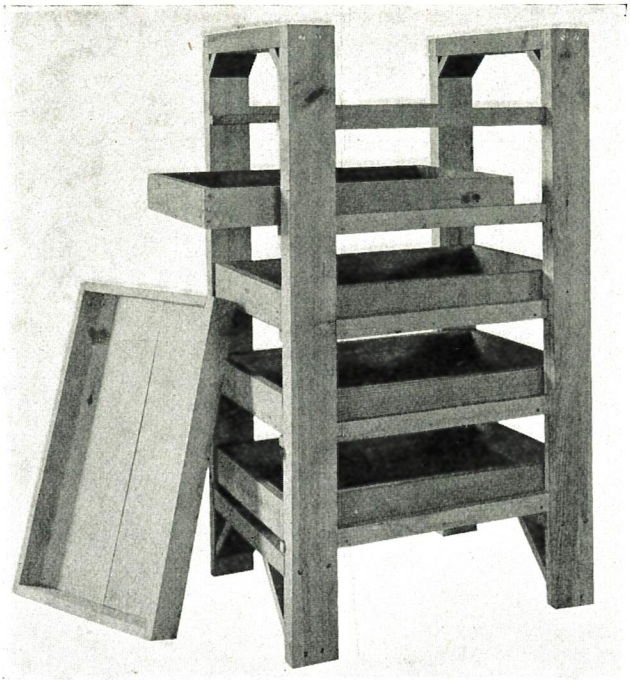
1. Reduce all pieces to finished dimensions.

2. Cut two gains across one side of each post $1\frac{3}{4}$″ wide, $\frac{1}{4}$″ deep; one at the top end and the other $6\frac{1}{4}$″ from the lower end.

3. Bore and countersink holes for the 3″ No. 14 screws and assemble the framework, placing two screws at each joint.

4. Mitre the ends of the braces at a 45° angle, bore and countersink holes for screws and fasten braces in place. Use a square in assembling the framework and make the corners square. An angle of 45° may be obtained by using any two equal figures on the steel square, one on the beam and the other on the blade.

5. Fasten the rests for flats by using two 6d common nails at each end of each piece.

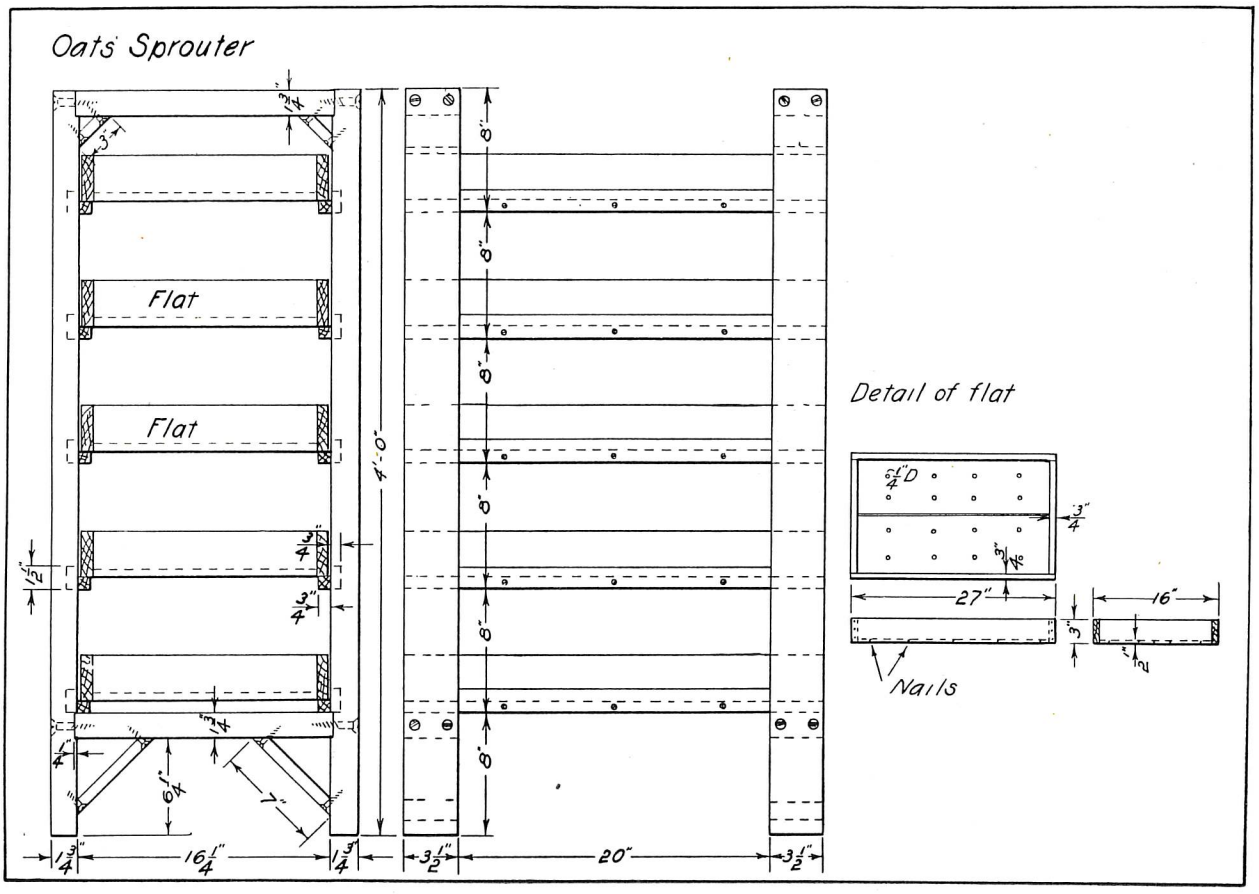


Oats Sprouter.

6. Fasten the guides to the rests by placing three $1\frac{1}{4}$ No. 7 screws in each piece as indicated in the drawing.

7. Assemble the flats by driving three 6d common nails thru each end of each side piece, four nails thru the end piece into the bottom, and five nails thru each side into the bottom; spaced as in detail of flat.

8. A space of $\frac{1}{4}$″ should be left between the two pieces for the bottom and $\frac{1}{4}$″ holes bored as shown in the drawing, to permit proper drainage.



INDUSTRIAL-ARTS MAGAZINE

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EDITORIAL

CONGESTED CLASSES.

THERE is scarcely another matter that disturbs the manual training teacher more than the matter of congested classes, and insufficient time and facilities for handling them.

It is not an unusual thing at all for a teacher to have twenty-five or thirty boys to take care of for a half-day with facilities for only fifteen or eighteen. From the standpoints of efficient teaching on the part of the teacher and of satisfactory work on the part of the boys, nothing could possibly be more discouraging.

It is a strange thing that many superintendents and others in authority will not see the utter waste, turmoil, and disgust that must result from such conditions. If superintendents were courageous enough to *try* teaching a class under such conditions, we surmise that they would experience a sudden awakening or change of attitude.

A case is reported where such an official, in the absence of the manual training teacher, attempted to handle a class of about thirty boys with facilities for only about half that number. Suddenly, one afternoon, the manual training teacher returned and found the superintendent seated on a bench whittling and busily trying to induce half of the boys to select some other course.

In all probability this man will see to it in the future that conditions as regards numbers, at least, shall be such as to make a reasonable degree of success at least possible.

When certain returns are being demanded of a man, how conducive to reasonableness and fairness it would be if those in authority would put themselves in his place for a time and experience his difficulties and trials under the conditions they themselves have imposed.

ACADEMIC WORK.

IN the revulsion of sentiment against bookishness and certain types of academic work which have taken place in recent years, we are not sure but that the matter has swung too far.

After all is said and done, a very large part of the education of the world will of necessity be acquired from books. Whatever worthy things civilization achieves and whatever movements it projects, sooner or later find their way into books. Hence, it would be a far happier outlook if this nation were a nation of serious readers.

It is a rather striking fact that present courses of study for the preparation of teachers of the industrial arts offer a very limited amount of academic work. In this we feel that they show a distinct and lamentable weakness. The value of such subjects as mathematics, economics, physics, history, English, etc., in the furnishing of material for concentrated, sustained, consecutive thought and attention is beyond anyone's power to compute.

For teachers, one of the first essentials is richness of thought, power of concentration, power of analysis, and ability to follow a logical line of reasoning. Certainly one of the best ways of gaining such powers is by faithful and methodical investigation of great problematic subjects thru authoritative and well written texts.

The pursuance of such academic work combined with sane, thoughtful work of a mechanical sort, would seem to be the ideal preparation for those who propose to teach the industrial arts. We venture the hope that more well chosen, properly related, and expertly taught academic work will speedily find its way into the courses for special teachers.

THE NATIONAL ASSOCIATION OF MANUFACTURERS' REPORT.

THE report of the Committee on Industrial Education of the National Association of Manufacturers is an interesting document, chiefly because it comes from that organization. As an educational document, however, it is "fearfully and wonderfully made."

On page 6 a vocational high school is severely criticised because its work is not correlated with a nearby industry. This defect is said to be due to a "lack of practical direction" and is "chiefly because the control has not been representative." A manufacturer speaking of the school is quoted as saying: "We will not give a week's credit against his three years of apprenticeship to a graduate of this vocational school. He would be no better to us than a bright boy right from the street." The report exclaims, "What a crime, educationally, against the boy graduate!" Evidently it has not entered the minds of the committee that the manufacturer *might* be at fault.

In the next page the report quotes "from one of its experts to the Wisconsin State Board of Industrial Education, which *is* representative in its personnel and seeks to secure full correlation between the schools and industries. 'In one city it was found that a group of boys employed in a tannery were attending a continuation school and making 'projects' in a woodworking shop. When asked about the school the tanner replied: 'It is good for a school, but why should my boys study woodworking?' "

Now if Wisconsin with its efficient board of practical men in charge of the industrial schools, whose president serves as chairman of the National Association of Manufacturers' Committee that holds up its hands in holy horror at the "crimes" of the vocational high school, cannot more closely correlate the work of the continuation school with the industries of the community, what argument can there be for having "practical men" on the board?

The report discusses manual training in the following language: "Manual Training as it has been developed or mis-developed in the United States is non-descript. It fits for nothing. In the elementary schools it is of as much the same value as a month's course in botany to a sailor. It might lead to something, but it doesn't. Children do not commonly go from the manual training schools into the industries. They go to college.

"Says a national authority: 'I'll take you thru all the manual training schools in this great city, and we won't find a set of tools fit for a mechanic to use.' The trouble is due to lack of correlation with the world of real work.

"Manual training as it ought to be, as it will sometime be in this country—the sooner the better—and as it is to the greatest advantage in Europe, in Munich for instance, is vocational training *and nothing else*, training in the various occupations, given with intelligent regard to the larger correlations. Says Dr. Kerschensteiner of Munich, in substance, 'How can you make any difference between manual training and vocational training? In both the same machines are used. The materials are the same and the products.' It is pure fad and ignorance that seeks to keep manual training a thing apart, 'purely cultural' (if we may be pardoned this wretched term). Shall we spend as much as we can and teach as little as we can? Our present manual training is for those who will never work with their hands."

The absurdity of this folderol is exceeded only by its asinine impertinence. In stating that children go from manual training into colleges, the writer forgets that *all children*, those that go to work at 14 as well as those who eventually go to college, go to the elementary schools. Therefore those who are going to work do get some manual training in most elementary schools. The person who made that statement about the tools is not an authority. An authority would know better. Every manual training teacher has had experience with mechanics who come into his shop and try to get tools from him, because the tools are in such good shape. Manufacturers of tools give schools special prices on tools and machinery, knowing that the manual training school will keep those tools and machines in such good shape, that they will be favorably advertised by that fact. Dragging Dr. Kerschensteiner, admirable character tho he may be, into every discussion becomes somewhat nauseating in time. However, this is what he says on page 28 of "The Idea of the Industrial School": "The essence of preparatory training for manual work does not lie in introducing into our manual training courses, tools, machines and materials that belong to a definite profession. The essential thing is to form and practice those organs, mental and physical, which are necessary for the vocation, to form habits of honest work, of carefulness, of thoroness and foresight, and lastly to awaken a real joy in work. If any one gains these qualities in any kind of systematic work, (e. g. woodwork), then he possesses them and uses them in any kind of manual work which his vocation later may call for." While this is coming very near to formal discipline, it is quoted to show the inconsistency of the N. A. M. report.

The amusing part of the report comes in the discussion of the wastefulness of the dual system of control in Wisconsin. As the chairman of the committee has been such a vigorous supporter of the Wisconsin scheme, we suspect that his tardy agreement with the supporters of the unit control in regard to wastefulness was unintentional. On page 12 of the report a bold head line states: "Two distinct and separate institutions in the same building doing the same thing—a bad condition for industrial education." On the next page is another headline: "Separate vocational school with its duplication—a bad condition. Let the high school in. Much duplication of expense can be saved by bringing them more closely together and have the industrial education serve both purposes under a carefully selected board, representative of the occupations and interests of the community.

"The academic school children should not be deprived of the contact with real life and working conditions found in the practical representative school."

If the "practical" men comprising that committee of the National Association of Manufacturers wish to have their opinions respected we suggest that they do not publish any further reports so inconsistent, illogical, and fallacious as the one under discussion.

Service is the coin in which humanity's debts are paid. Our debt is tremendous—the liberties we enjoy, the food we eat, the clothes we wear, the houses in which we live, are not of our own getting. We owe for all of them. In our civilization, countless thousands serve every man every day. And as man rises above the average of his fellows, the thousands become tens of thousands, and his debt to humanity grows heavier.

What we must realize before eternal justice will be established upon this earth is that no man can pay his debt, and also that the only happiness he can have is in trying to pay it.

And we must realize that folly's crown is on the head of him who tries to pay his debt to humanity by mere money. —*William Allen White.*

PROBLEMS AND PROJECTS

THE Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, presents each month a wide variety of class and shop projects in the Industrial Arts.

During the year 1916, the Magazine will award a monthly prize of $10 for a meritorious problem used in the Department. This is not a prize contest in the ordinary sense. Every problem accepted for publication will be paid for. The prize will be simply a reward of merit.

From the material submitted by readers, the Editors will select each month for the award one problem of especial merit, judged from such standpoints as originality, good construction, artistic merit, adaptability to school work, and quality of drawings and photographs submitted.

The brief description of constructed problems should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in *benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work,* and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE,
Milwaukee, Wis.

DRAWING BOARD SUPPORT.

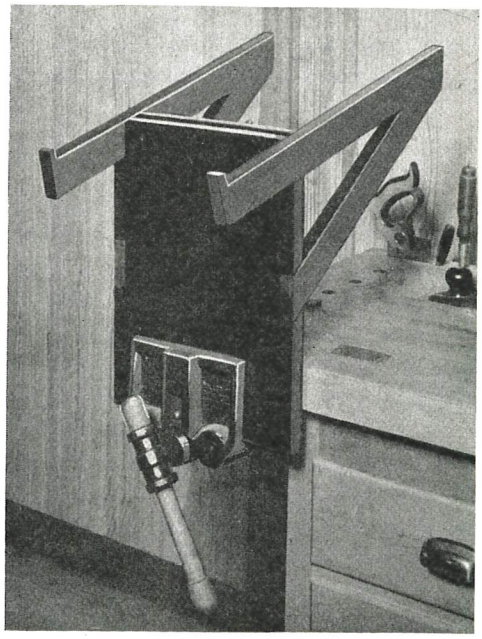
Daniel Shirck, Director Manual Training, Atlanta, Ill.

I have found it very inconvenient for the boys in the mechanical drawing class to use the work bench for a table in drafting. Since there is only one room devoted to manual training and mechanical drawing and most of the space is taken up by benches, lockers, lumber racks, etc., it became necessary to devise some scheme for drafting purposes.

After some little experimenting I made a support that would fit in the vise. This support can be adjusted for any size boy, by raising or lowering it in the vise.

The support can be placed on the cross pieces of the bench when not in use where it will not interfere with the bench work. It is also useful for the drafting necessary in bench work.

This support proved to be a very good problem for the boys because it involved the making of some joints that require careful work. They also took an interest in making it because it was the solution of a practical problem.



The Drawing Board Support Mounted in a Vise.

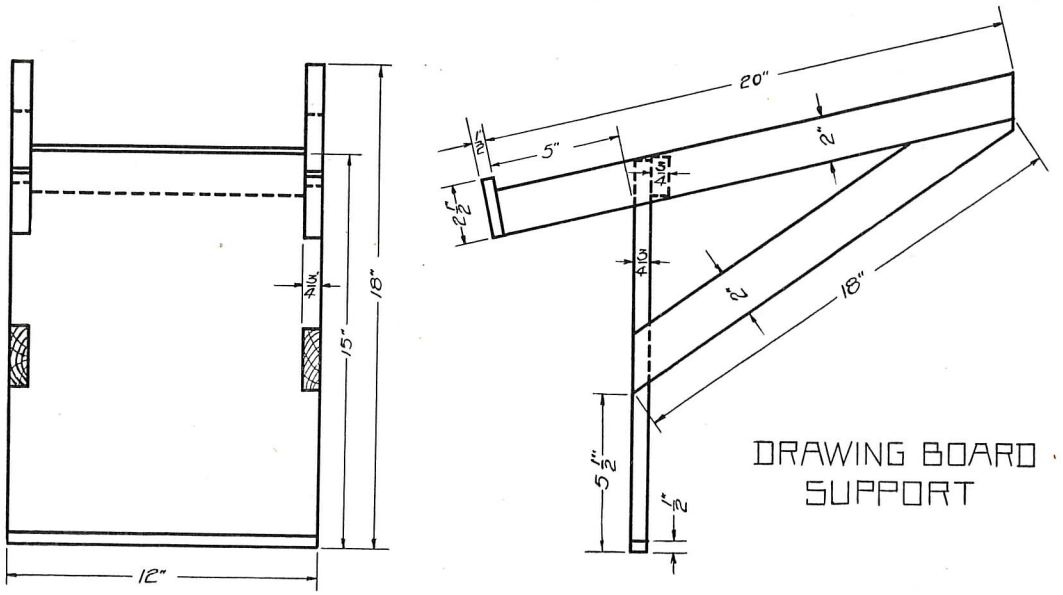
CAST-BRASS CANDLE STICKS.

N. L. Franklin, Madison, Wis.

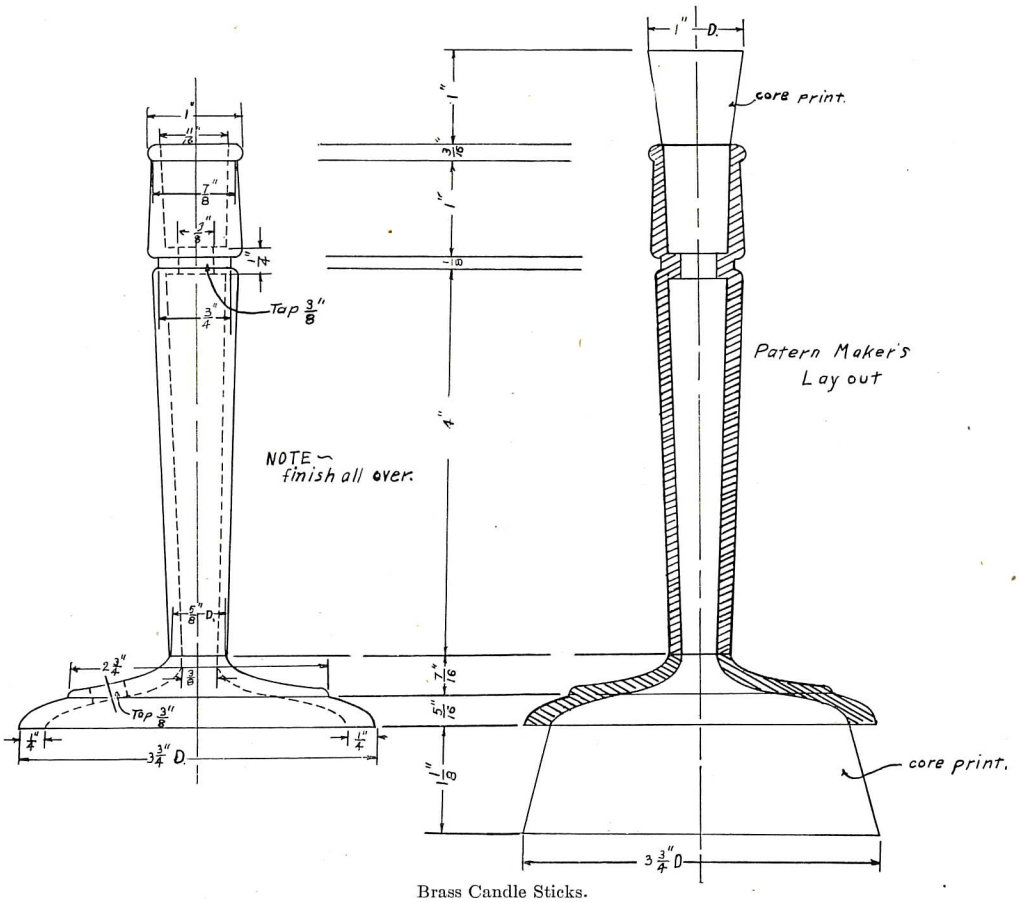
An excellent project, for the correlation of patternmaking and foundry practice, is the making of cast brass candle sticks. These candle sticks may be made in almost any size and shape. These shown in the illustration may be used as a combination of candle or electric light.

The first step in the making of the pattern is the patternmaker's layout. This is laid out in full size with a brass shrink rule on a soft pine board with draft and finish added. The pattern is then turned with a slight bevel on the core prints if the stick is to be used for holding candle only. If it is to be used for both, candle and electric light, this bevel is not necessary as it is put on merely for the purpose of holding the core in each end when there is no connection between them, as is necessary in case of the electric light to permit the wire to go up the inside. The pattern, when finished, should be shellaced in the lathe.

The core box is made in three sections to facilitate the work of cutting out. The bottom section of the core box may be turned on a lathe by taking two pieces of stock



Details of Drawing Board Support.



Brass Candle Sticks.

large enough to form the bottom of the core. Screw these onto a face plate, being careful to get the center line across the face plate and the dividing line of the two parts exactly coincident. Only one half is used, but it saves time and work by turning it out. A template is made in order to get the exact size and shape required.

In the foundry, if flasks are scarce, two molds may be made in each flask by the bedding in process.

To finish the candle sticks place a wooden plug in each end; then center it in a wood lathe, and with a file take off all roughness; finish the polish with emery cloth and a felt buffer. In order to preserve the luster of the polish a coat of lacquer is applied.

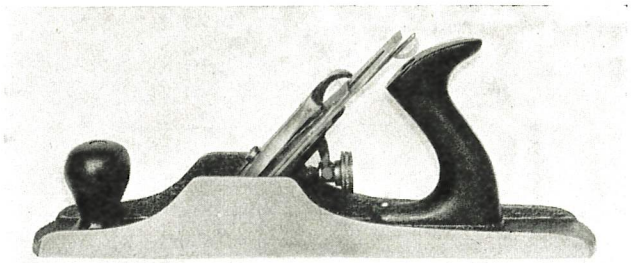
JACK PLANE.

Edward Berg, Washington High School, Milwaukee, Wis.

The Jack Plane is a problem which offers a variety of metalworking processes and which is of intense interest to the student. The design and dimensions, with a few exceptions, were taken from a Stanley 14-inch jack plane. The drawing of the bed alone is submitted, as the dimensions of the other parts can be taken direct from the Stanley plane.

The making of the plane-iron and the plane-iron cap should be taken up first and can be used as a problem in itself. The metal is purchased in the proper thickness and width and brought to the desired size and shape. This includes laying out, drilling and filing and is a good beginner's problem.

The bed and the frog are cast of grey iron and can be machined on the shaper, planer or milling machine. They make good problems for the shaper and are perhaps finished in the least amount of time on this machine. The bed can be set up in a vise for all operations. The bottom and sides are machined after which the seat for the frog is finished. The opening in the bottom for the blade is laid out carefully; the stock is removed by drilling and it is then filed to size. A file with one safety surface should be used. The frog is also machined in the shaper vise. The slots thru which it is screwed to the bed are made by drilling and filing. A jig can be used for drilling the holes for the adjusting-nut stud, the adjusting-fork pin, the lateral adjustment lever and the clamping-iron screw.



The Completed Plane. (See details, page 318.)

The writer has found it best to cast the adjusting-yoke and the cam of brass. They are finished with the file as is also the clamping-iron which may be a grey iron or malleable casting. A 5-16″ cap screw can be used to make the clamping-iron screw and the threaded part of a long 5-16″ cap screw can be used for the adjusting-nut stud. The screws which secure the frog are made of $\frac{1}{4}$″ cap screws, or fillister head machine screws are used. The adjusting nut can well be made of steel. The making of the remaining parts and the assembling will suggest themselves to the instructor.

CRIBBAGE BOARD.

George H. Wichmann, Marble, Minn.

THE cribbage counting board gives a simple problem in inlay work. The body of the cribbage board should be

PLACKET GUSSET.

Marian Whitwood, Tulare, Cal.

This gusset may be used in a skirt closing or on sleeves of waists where a tailored placket is not desirable, but it is especially good for use on children's drawers, as the goods below the opening positively will not tear when finished this way. When other ways of closing are used, any extra strain is sure to result in a tear *below* the opening.

If desired, have model made entirely by hand. A very satisfactory lesson can be given, however, on the drawers. The same style of placket may be used for the opening in a petticoat, even if there is a seam below where the opening is to be left.

First make a slit the desired length (better tear, if possible). See Fig. 1. Take a lengthwise strip of goods about 2″ wide and twice the length of slit (+ ½″ to be sure it will reach). The first seam should come on the *right* side of the garment, if done by machine, and on the *wrong* side, if it is to be finished by hand. Lay edge of strip even with edge of slit with strip uppermost or next to you. Baste seam about ¼″ deep to within ½″ of lower end of slit. Without breaking basting thread, half-back-stitch around end to ½″ distance on the other side, being very careful to distribute fullness evenly and to keep the two raw edges exactly even. Without breaking thread, baste to end and fasten. See Fig. 2. Stitch, being careful to take no deeper seam than that already made by half-back-stitch. Turn other edge under as for a hem. See Fig. 3. If finished by hand, hem securely, if by machine, stitch in place. There should be absolutely no wrinkles at lower end of placket, if the work is done properly. Now, fold under the side which is to lap over the other and leave in this position when sewing on band. See Fig. 4. Across lower end of placket sew diagonally and fasten securely. See Fig. 5.

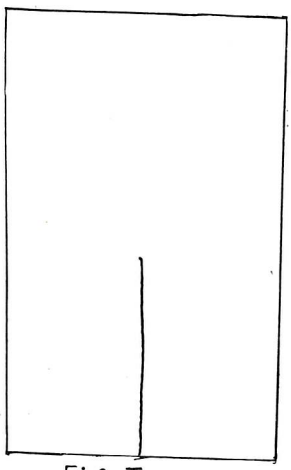


Fig. I

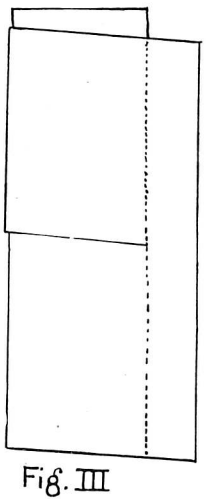


Fig. III

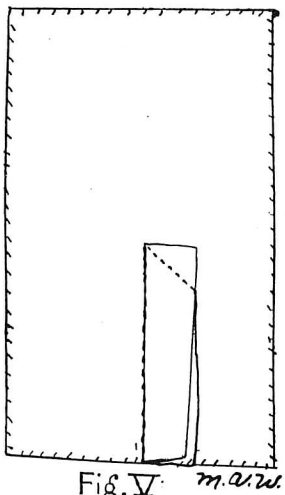


Fig. V

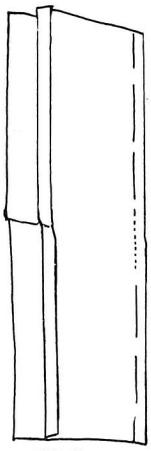


Fig. II

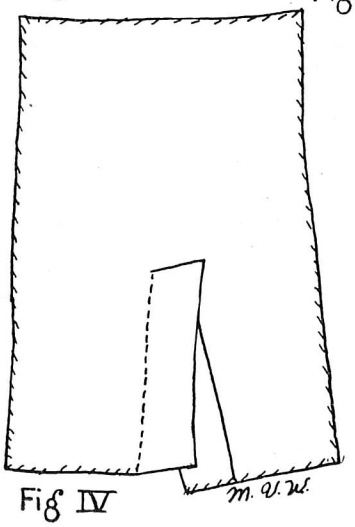


Fig IV

TO SCRUB IN A BACKGROUND.

The following description of the method of scrubbing in a background was suggested by a recent question in the "Now Are There Any Questions" Department of the *Magazine.*

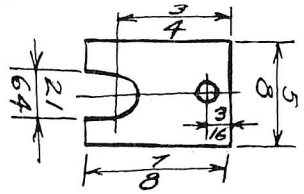
For this purpose the following kinds of paper may be used: charcoal, water-color, wrapping, American, Normal, grey and natural colored manila drawing paper. For scrubbing in a background, the paper should be stretched as tightly as possible on the board, using thumb-tacks and adjusting them whenever the paper seems loose. The board should remain flat while the "scrubbing" is going on. Mix in a dish or paint pan sufficient color to complete the tinting. The old saying is a good one: "Mix three times as much wash as you think that you will need and perhaps you will have half enough." For paper up to 12″x18″ a flat bristle brush an inch in width should be the smallest used. One costing ten or fifteen cents will prove adequate. Charge the brush heavily with the wash and carry it across the top of the paper from left to right. Recharge the brush and carry it across again, taking in the lower edge of the first stroke. Continue this operation until the whole surface has been covered. When this has been completed, turn the board at right angles to its former position and repeat the process. This finished, return the board to its original position and brush the wash in as before, continuing to alternate the strokes until a color a little darker than the desired tone has been obtained. Dry the brush thoroly or take a fresh one, and "scrub" it back and forth, alternating the directions as when putting on the color. Continue until the paper is dry or very nearly so. The brush should be dried by wiping on a cloth or paper whenever it becomes wet. Unbleached muslin may be treated in the same manner.

The paper prepared is most interesting for composition or design work. It also furnishes a pleasing background for pen and ink sketches where a hint of color is desired as in an etching or mezzo-tint. The cloth is very effective when enriched with block-printing or stenciling.

Lila M. Delano, Seattle, Wash.

AN ERROR.

The problem of a "Metalworking Vise" illustrated on pages 223 and 224 of the May issue of the *Industrial-Arts Magazine* contained a minor error in the drawing illustrating the retainer. A corrected drawing of the retainer is shown herewith.



Wilson H. Henderson has been placed in charge of all the work of the University of Wisconsin Extension Division in the Milwaukee district, succeeding E. M. Barrows, who has resumed his work with the People's Institute of New York. For purposes of administering University Extension work, the state is divided into six districts, each in charge of a district representative with a corps of instructors. The University has a building in Milwaukee occupied by the district offices with classrooms and school paraphernalia.

For the past two years, Mr. Henderson has been Assistant Professor of Industrial Education in charge of the Course for Industrial Teachers of the University Extension Division, which is conducted in Milwaukee. He will continue in charge of this course, and in addition will be representative for the Milwaukee district of the state.

Mr. Frank H. Ball, supervisor of elementary industrial education in the Pittsburgh schools, has accepted a position as head of the industrial arts department at the Santa Barbara, Cal., State Normal School.

ITEMS OF CURRENT INTEREST

INDUSTRIAL EDUCATION IN GARY.

That the aim of the Gary school system, particularly as regards pre-vocational education, should be commended, but that this aim is not fully realized at present, is the result of a study of the Gary schools made by Mr. Silas G. Mallory for the Minneapolis Board of Education. Mr. Mallory's findings are interesting in that they are largely comparative as based upon the situation in the city of Minneapolis. Mr. Mallory finds that the cultural aim of manual training is not realized in Gary but that industrial work with an industrial aim is predominant. Joinery and woodworking as taught in most manual training schools has been discontinued in Gary in all but one school. What carpentry and cabinetmaking is offered is, in his opinion, mediocre as compared with the work offered in Minneapolis both in the high schools and the grades.

Speaking of the administration of the shops, Mr. Mallory writes: "First, the general atmosphere of the shops is of a character that would not be tolerated by any of our principals or supervisors. I am a firm believer in the freedom of the shops, but when conditions become so bad that no attention is paid to the instructor, that acts of a gentlemanly nature are disregarded entirely, then the work ceases to be of any cultural value whatsoever. This condition of affairs has been caused by three things: Lack of organization, too much freedom in the school, and most of all, from a lack of proper supervision. Under the direction of good supervisors, a teacher will work for the best interests of the pupil but when this ceases to be exercised, he will fall into a rut, many times unconsciously, and the efficiency of effort will disappear. In all of the shops visited, with the single exception of the Froebel, I failed to see more than half of the pupils at work. The balance were running around, interfering with those desirous of learning something about construction. Theory in any of the shops is absolutely unknown. The pupils are not taught the names of the tools, their uses, the care of the same and other points."

The pre-vocational department of the Gary schools gives the boys preliminary trade training in forging, foundry work, machineshop work, sheetmetal work, plumbing, printing and shoe repairing. It gives boys in the grades an opportunity to select a vocation before leaving school, and makes them familiar with shop conditions. The trade idea is commended by Mr. Mallory but considerable fault is found because the school system has overstepped the bounds in its efforts to produce commercial work. The pupils, as well as the teachers, have become commercialized. Each department is self-sustaining and is closed as soon as it fails to be a producer. It is pointed out that, in some cases, the teachers have been the real producers. In special work, the pupils have not the necessary skill to do the work and the teacher is compelled to undertake it. The system results in a loss of valuable instruction for the pupils and a lowering of the efficiency of the shop.

One of the serious objections which Mr. Mallory finds in the system is the fact that the boys and girls are enrolled in shop classes at too early an age. He writes: "Boys are placed in the shop in the third and fourth grades in order to occupy their time and are given work too difficult from a physical standpoint, with the result that they are forced to leave the shop with the day's work still uncompleted. This is not only my view but that of Gary instructors, one of whom remarked that such work is absolutely worthless from an educational standpoint. Girls of the grades are assigned work in the sheetmetal shop and foundry for the simple reason that there is no room in other classes for them. This fact forces the boys to take work in the sewing room to fill up the time."

The foundry work is very commendable, in Mr. Mallory's opinion, but objection is again made to the immaturity of the pupils. In the forge room the work is of practical value because the articles made are put to immediate use in the schools. Boys of the lower grades act as helpers, allowing them to become acquainted with the run of the work. The machineshop work, which is limited to 16-year-old boys, is offered to high school students only. Younger boys are employed in the capacity of helpers.

The sheetmetal work is limited to practical problems suitable for use in the schools. Objection is made to the rigid requirements for production, as found in the other departments. The instructor is compelled to do a great deal of the work because of the amount of work and the lack of time in which to give definite instructions. The boys in the meanwhile remain in idleness. The plumbing classes have limited themselves to the installation of plumbing in the schoolrooms. It is questioned whether the work can be continued beyond a certain point.

The printshop is especially efficient in the amount and character of the work turned out. The boys print all the announcements, school papers, posters, cards and menus for the schools and there seems to be little difference in the quality of the work of either grade or high school students. The shoe repairing department is commended for its humanitarian as well as cultural aspects. Boys too poor to pay for the repair of their shoes are permitted to do the work in the school shop. A great many shoes are made out of old ones donated to the shop.

The pre-vocational work is commended for the aim which it has but it is criticized for the poor administration and supervision. It is the opinion of Mr. Mallory that the vocational work should be limited to the trade and technical schools, leaving the more elementary work to the regular school shops.

In summing up, Mr. Mallory writes: "The aim of the Gary system, particularly as regards pre-vocational education, is to be commended; but this aim is not carried out at the present time owing to poor organization and supervision; the unity of high school and grades has a marked influence on the grade pupils but retards the high school; the work commonly called manual training is, in the Gary school, inferior if the education of the boy is the aim of the school."

Mr. Mallory concludes that it would be more to the advantage of the Gary system to study some of the features of the Minneapolis schools than it would be to the Minneapolis schools to accept the Gary system of industrial education.

BUSINESSMEN ENDORSE FEDERAL AID FOR TRADE SCHOOLS.

At a referendum vote of 350 commercial organizations, chambers of commerce and boards of trade in 42 states, Alaska, Hawaii, District of Columbia and the American Chamber in Paris, endorsement was given the recommendations of a special committee for government aid in industrial training in the respective states. That the business interests of the country are unquestionably in favor of federal aid for vocational education is indicated by the number of votes cast in its favor by the respective organizations. All four recommendations of the committee, of which Mr. Frederick A. Geier is chairman, were carried by more than a two-thirds' majority.

On the first recommendation providing for federal appropriations for the promotion of vocational education in the United States, there were 831 favorable votes cast. In order that the assistance of the federal government may be effective, it was urged that a relation be established between federal and state appropriations and that provisions be made for federal administration for the part which the government would take.

A second recommendation which provided for federal appropriations allotted among the states upon a uniform basis, and bearing a uniform relation to appropriations made by the states for like purposes, was carried by a vote of 828.

The third recommendation urged the creation of a federal board to administer the national functions in vocational education which are proposed, this board to be given compensation sufficient to command in its membership the great ability appropriate for the task to be performed. A vote of 788 carried the recommendation.

The fourth recommendation, which was supported by

784 votes, urged that the federal board, however constituted, be required to appoint advisory committees of five members each, representing industry, commerce, labor, agriculture, home-making and general or vocational education. It was further provided that these advisory committees be appointed for only such periods of service as the federal board may determine; that the members receive reimbursement for traveling expenses and compensation for time actually spent in the active discharge of their duties; and that the personnel of the committees represent as many different parts of the country as the geographical distribution of the industry in question will permit. To prevent unnecessary expenditures for committees, the aggregate amount to be spent in any one year may be limited to, perhaps, $50,000.

Especially interesting is the personnel of the committee whose report was so unanimously endorsed. The members, besides the chairman, are: A. B. C. Dohrmann, of San Francisco, Cal.; Maurice Fels, of Philadelphia, Pa.; A. Lincoln Filene, of Boston, Mass.; Dr. Charles McCarthy, of Madison, Wis.; Dr. C. A. Prosser, Minneapolis, Minn.; G. L. Swiggott, Washington, D. C.; Asst. Supt. Frank V. Thompson, Boston, Mass.

It is the opinion of the special committee, as brought out in its report, that without government co-operation and the impetus from federal appropriations, the states can themselves develop vocational education very slowly. The industrial welfare of the country demands haste consistent with care. The Federal Commission on National Aid to Vocational Education, appointed by the president in 1914, has reported that only eight states have established systems of vocational education, and these systems have not yet reached one per cent of the workers who need industrial training.

Altho it urgently recommended federal aid in vocational education, the committee made no suggestion that the government should do more than extend to the states its financial assistance and encouragement thru its appropriations and its example. The administration of the schools should remain wholly in the hands of the local authorities and the instructors should be municipal or state employes and not federal employes.

THE N. E. A. IN NEW YORK CITY.

The National Education Association is to be entertained in New York City during the week of July 3-8 in a manner unparalleled in its history. New York City, it is declared, will show the association that it is not only the largest city in the nation, in population, wealth and commerce, but also that its ability to entertain a great national organization exceeds that of every other city.

A committee of 188 men and women, including educators, financiers, public officials, businessmen and social leaders, will be in charge of the preparations and management of the convention. Mayor Mitchel is honorary chairman of this committee and Mr. John R. Young, manager of the convention bureau of the New York Merchants' Association, will be executive officer to assist Secretary D. W. Springer in the management of convention affairs.

The general sessions of the association will be held in Madison Square Garden and here also will be housed the commercial exhibits. Sectional meetings will be scattered in the halls of the three headquarters hotels, in the Washington Irving High School and in other educational institutions in the immediate neighborhood. The Astor Hotel will be the headquarters for New York and the New England States; the Waldorf-Astoria will accommodate Pennsylvania, New Jersey and the South Eastern States and the McAlpin will be the headquarters for the Middle and Western States.

Among the speakers at the general sessions will be President Wilson, Judge Taft, Governor Whitman, Mayor Mitchel, Dr. Finley and other prominent men in education and public life.

Every educational institution in Greater New York will throw open its doors to the school people and special efforts will be made to display the work of each. Members of the departments will be able to view practical laboratory and shop work in the respective schools.

FRANK ALVAH PARSONS,
New York City,
President of the Department of Practical Arts,
National Education Association.

The Department of Vocational Education and Practical Arts has prepared programs for two sessions. It will join with the American Home Economics Association in a special session for the discussion of problems relating to household education. The first regular session will include a program in which an attempt will be made to find out what the vocational trades are, what education is required for them, what preparation the schools are now offering boys and girls. The speakers will be persons who have made phenomenal successes in their respective callings. The second session will be devoted to a discussion of what is being done in educational work to meet the entirely new educational problems that confront a people when its national, international, social, and political fabrics undergo a radical change. Mr. Frank A. Parsons, president of the New York School of Fine and Applied Arts, is president of the department and will preside over these meetings.

Teachers who are planning to attend the convention are advised to write for detailed programs and hotel information to Mr. John R. Young, in care of the Merchants' Association, New York City, or to Secretary D. W. Springer, Ann Arbor, Mich.

ARKANSAS MANUAL ARTS TEACHERS MEET.

The convention of the Manual Arts Teachers of Arkansas was held April 6-8, at Little Rock.

The Manual Training Section, which was in charge of E. W. Hosack, was attended by ten of the manual training teachers in the state.

R. E. Livingston read a paper on The Relation of Manual Training to the Industries; E. A. Funkhouser, of Jonesboro, discussed the establishment of a high school drawing course and the method of teaching it; Mr. Gollett discussed the Establishment of a Proposed Course for the Upper Grades; The Standard of Work Required for Manual Training was discussed by Mr. Gladson of the University of Arkansas.

The officers elected were: E. W. Hosack, Little Rock, president; E. A. Funkhouser, Jonesboro, secretary.

CONNECTICUT ARTS ASSOCIATION.

The annual meeting of the Connecticut Manual Art Teachers' Association was held during the convention of the Eastern Arts Association in Hotel Kimball, Springfield, Mass., on Saturday, April 22, 1916. President Joseph Wiseltier of New Britain, Conn., presided.

It was voted to change the name of the organization from the Connecticut Manual Art Teachers' Association to the Connecticut Arts Association and to hold the fall meeting and exhibition in the city of New Haven in connection with the convention of the Connecticut State Teachers' Association.

The organization went on record as being heartily in sym-

pathy with a movement advocating a joint annual convention of all state-wide educational associations in Connecticut to last for more than one day.

The following were elected to office for the ensuing year: Mr. E. A. Kraus, president, Short Beach; Miss Frances Bachelor, vice-president, Talcotville; Mr. William L. Hagen, secretary and treasurer, New Britain.

Executive Committee: Mr. F. Ward Brackett, Greenwich; Miss Maud Simpson, Meriden; Mr. Robert F. Logan, Hartford; Mr. Edwin M. Roberts, Glenbrook.

STAND-PAT KING-PINS AND OTHERS.

J. L. Kerchen, Director of Manual Training, Portland, Oregon.

I have read, with sincere pleasure, in the June number of the *Industrial-Arts Magazine*, the serio-comic article on Stand-Pat King-Pins. Such a genuine, vigorous, spontaneous expression on the part of one who is the "George who does it" is a challenge and a stimulus not to be ignored.

It is true (yes, very true) that supervising king-pins and king-bolts, with all the intermediate gradations, do very frequently find themselves too far removed from the immediate problems of the shop teacher. And yet be this as serious as it may, it pales into insignificance when compared to the "stand-patism" of the shop teacher with no consciousness outside the fact that he keeps his time, draws his salary, follows a course of study and reacts consistently on those who try to put a little educational content in the work of the shop. To my way of thinking the most serious menace to industrial education—with emphasis on the *education*—is the shop teacher who sees only the craft, and misses the significance of the economic and educational status of the subject.

As nearly as I can determine, from a careful perusal of the article, the substance of the matter resolves itself into four propositions upon which the writer seems perplexed. These, in order, are as follows:

(A) That educationally, "we are on the way, but do not know where we are going."

(B) That unless we impress the public with the importance of our work, and do so continuously, we shall be turned out into a cold world to work for a living.

(C) Information on the ungraded boy in the shop; mixed grades in the same class; large and small classes, etc.

(D) That we are unjustly expected to accomplish too much in the short time allowed.

With reference to proposition A: The writer does not recall a single sentence in recent manual-training literature which is laden with so much truth. In no other department of education has there been such an extravagant expenditure of public money with so little understanding of the fundamentals that govern the case, as has been true in the equipment of many of the industrial schools of the country. Yet we ask Why? Is all this machinery for cultural values? We did not say so when we first began this form of education, but now we are more or less eager to admit that a certain amount of shop work has just as much cultural content as some of the socalled cultural subjects.

Will this kind of training enhance the wage earning power of the boy? I do not believe it has yet proven that the manual training student possesses a greater wage earning capacity than the other students of a like grade.

What is the matter? Have we taken into consideration the fact that we no longer live in an age of hand production or handicraft methods? Is the world crying for the services of such as were trained by a tenure of apprenticeship at the bench for four or five years? Are there industries today that are neglected because hand skill is not obtainable? Are we not living in an age of machine production? And does machine production mean the elimination of hand skill? To see the amount of emphasis that the average manual training teacher places upon the exact use of the plane, for example, makes one think that the average boy would do nothing but use a plane all the remainder of his life.

Are we not emphasizing the importance of productional knowledge when the problem of production has been practically solved? There never was a time when we could produce so abundantly as we can at present. We can produce for ourselves, for the markets of the world, and still have an army of two million unemployed. So the production of goods, in the last analysis (and it is with just this that industrial education deals), is not the prime desideratum.

The welfare of humanity does not depend upon production but upon a more just distribution of the goods already produced. To me this is the great problem of industrial

The above is a picture of the new Manual Training Building of the New Mexico University at Las Vegas, N. Mex., which the pupils—of whom one-fifth are shown—of that department constructed under the supervision and instruction of Mr. Claude D. Williams, Director of Manual Training.

The building measures 40 by 80 feet and includes a Mechanical Drawing Room, a Recitation and Demonstration Room, a Gluing and Finishing Room, a Lumber and Supply Room and a large Bench and Machine Room.

In the erection of this building the pupils did all the work. The group or gang system was employed whenever possible with three or six boys to the group, the boys taking turns acting as captain or foreman of the group. The captains were held responsible for the work done. The plan worked well and the boys took a personal interest in the building and an added interest in the department.

education. Teaching a boy a handicraft may serve as an educational agency of as much value as physics, mathematics or chemistry but to assume that modern industry offers alluring inducements to the hand worker and to organize as a school on the above basis is, I think, a huge error.

Why are there so few strictly trade schools in the country today? And also why has not the trade school idea met with the response that the technical high schools of the country have? It is because factory specialization, jigs and the machine process have practically eliminated the skilled tradesman.

Not many writers upon the subject of industrial education see the economic background upon which the vocational idea must base its trend. Professors Carlton and Roman are two brilliant exceptions.

On proposition B, I extend my heartfelt sympathy. I have often wondered why it is that after some fifteen or twenty years we have to continually make exhibits, write articles, make furniture, help the janitor, and what not, to keep our place under the firmament.

Why are we continually asked to show reason for our existence? I presume that because our work lends itself well for exhibit purposes answers the question partially.

Yet we long for the day of security which is the privilege of the academic studies. The sciences, mathematics and the languages are not called upon to continually parade their merits in order to keep their place in the school curriculum.

Sometimes we are tempted to ask: Is not our work self-sufficient in itself? Is not its value demonstrated without the ceaseless effort to show why? Will it not some day speak for itself? But, of course, exhibitions are important and should be used to show the real nature of the shop courses.

Under proposition C: Teach your large, rural, ungraded boy individually till he "fits in" with the regular work of the class. My experience has been that the ordinary country boy has enough of the compensating qualities to soon adjust himself to the emergencies of the situation.

The outside shop containing many grades is a perplexing problem. I advise handling it as follows, no matter what the number of grades: Divide your class in such a way that you will not be required to give a class demonstration to the two divisions during any one recitation. Require each group to do the same problem. Of course, such an organization will not permit a close following of the course of study but the most important thing in a case of this kind is an economic method of handling your boys.

No supervisor should send you a class far beyond the capacity of your shop. To the small classes there can be no objection on the part of the shop instructor.

Proposition D is true. We frequently are asked to accomplish more than can reasonably be expected, especially in the conventional one-fourth-day period per week. Yet I have seen, and do see, a great deal of this time wasted. In the prevocational classes there is a yet greater proportional waste of time. The maximum of efficiency in the economy of time is the big manual training problem. It comes to the very skillful teacher only. The teacher who can interest only half his class in the project, at one time, is usually about fifty per cent efficient.

INDUSTRIAL TEACHERS OF HUDSON COUNY, NEW JERSEY, MEET.

The third, and final, meeting of the year of the Hudson County, New Jersey, Industrial Teachers' Association was held on May 13th at Bayonne. Over seventy teachers were in attendance. The forenoon was given to group discussions of the various lines of industrial work, while the afternoon was taken up by the general sessions.

At the high school were held group conferences on Domestic Science, Dressmaking and Sewing, Millinery, Art Drawing and Manual Training. At the Bayonne Vocational School there were also group conferences on Related Academic Work, Electric Wiring, Printing, Machineshop Work, Vocational Woodworking and Mechanical Drawing. At the high school, Miss Kelly of Jersey City spoke on *Domestic Science in New England Schools*; Miss E. M. Backus of Hoboken, on *Cooking in Large Portions*; Miss G. N. Deacon, Jersey City, on *The Domestic Science Conference to Be Held in New York City in* 1916; Miss Mary Canfield, Newark, on *Hints for Making Domestic Science Far-Reaching*; Miss Estelle Leonard, Hoboken, on *Plain Sewing in an Evening Industrial School*; Mrs. Pransky, New York City, on *Universal Methods in Dressmaking*; Miss Attie Souder, Teachers College, New York, on *School Exhibits for the Domestic Science Department*; Mr. J. Fishkin, Jersey City, on *An Electric Motor Made From Wire Nails*; Mr. Frank Beardsley, Bayonne, on *General Manual Training*; Mr. E. J. Herd, West New York, on *Shop Methods.*

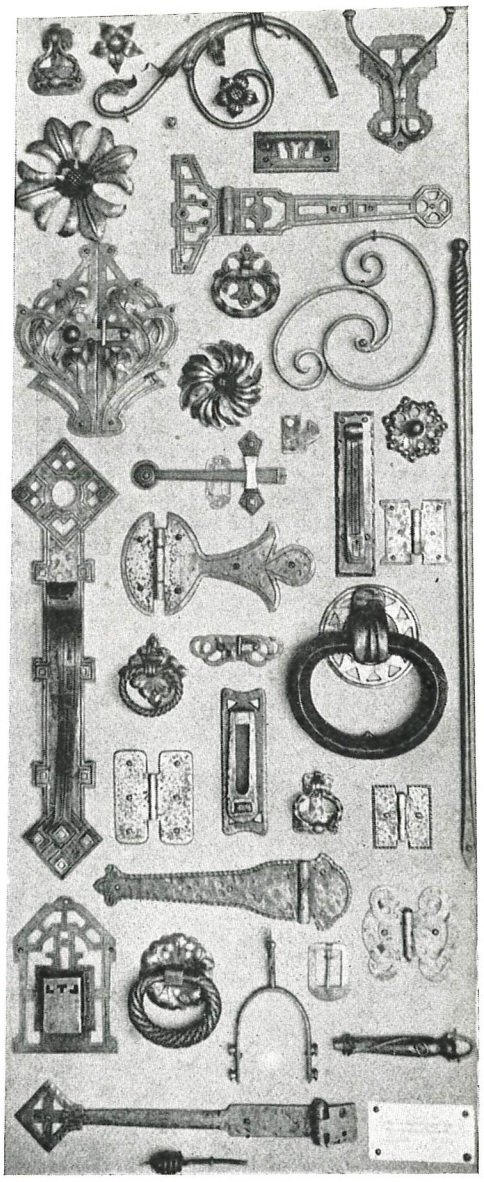


Exhibit of Forge Work by Students of Mr. Thomas F. Googerty, Pontiac, Ill.

At the Bayonne Vocational School, Miss Margaret Hammil, Jersey City, spoke on *Machineshop Arithmetic*; Miss Grace Francisco, Jersey City, on *How to Teach English*; Miss Edna Kelley, Jersey City, on *Woodworking Shop English*; Mr. Wm. T. Savage, Bayonne, on *Elementary Machineshop Work*; Mr. Cleveland Austin, Bayonne, on *The Vocational School Woodworking Shop*; Mr. Handforth, Jersey City, on *Machine Design*; Mr. Walker, Jersey City, on *Elementary Mechanical Drawing*; Mr. Samuel Horwitz, Bayonne, on *Vocational School Drawing.*

At the conclusion of the discussions, the teachers adjourned to the high school lunchroom, where a dinner was

served by the domestic science classes, under the direction of the supervisor.

In the afternoon, a general meeting was held with Mr. E. G. Traua presiding. Mr. M. W. Haynes, Principal of the Vocational School, welcomed the teachers, after which short reports were given on the recent convention of the Eastern Arts Association at Springfield, Mass., by Dr. E. B. Kent, Jersey City, and Mr. Frank Mathewson, Jersey City.

The convention reports were followed by an address given by Mr. Edward A. Reuther, State Supervisor of Manual Training. Mr. Reuther called attention to the changed conditions of life, and to the spirit of unrest prevailing thruout the political, industrial, social and religious world at present. He urged that teachers recognize the importance of taking their work seriously in order that they may contribute to the solution of the great problems of practical education with which the schools are now concerned. Valuable hints were given on the details of teaching shopwork, domestic science and art.

The three meetings which the association has held the past year have been of practical value to the teachers who attended. The group work has proven a particularly helpful feature, because teachers of the several school systems of the state have brushed shoulders with one another, and have learned to discuss their respective problems jointly in a professional manner, without the presence of principals or supervisors. The mutual acquaintance between teachers of similar subjects has also proven a source of inspiration and help to the individual class teachers.

BOYS AT NEW PROVIDENCE ERECT MANUAL TRAINING ANNEX.

The practical value of the manual training instruction in the village of New Providence, N. J., was demonstrated during the past school season by an emergency which the teacher and the boys of the school met in a prompt manner. The school was in immediate need of an extra room to accommodate a new class of 32 in manual training. A canvass of the town showed that no suitable room was available.

The manual training instructor offered, with the aid of his students, to erect the necessary building. The structure, which contains one room, measures 28 feet by 20 feet 4 inches. The general construction work was done by the 49 boys in the manual training classes, working under the direction of the instructor. Two unskilled men were employed to help with the grading and rough work, and to move and install the furniture and equipment. The building was completed and ready for occupancy within two weeks.

The erection of the building was undertaken as a practical community problem. The boys were told that they could give time to the work before school in the morning, at recess time, during the noon hour, manual training periods and on Saturdays. No work was permitted after school hours. Preliminary instruction was given in sawing lumber, cutting to proper lengths and laying the foundations.

The cost of the building, excepting the heating, which was effected by several radiators fed by steam from the main building, was as follows: Lumber, including wall board, $422.52; hardware, $9.93; paint, stain and varnish, $14.36; unskilled labor, $56.50. The total cost was $503.31.

GENERAL NEWS NOTES

New York, N. Y. The board has extended the Gary plan to provide for three times the number of children formerly accommodated under the duplicate school plan. The sum of $3,847,695 will be expended in new buildings, alterations, repairs and equipment of existing buildings for the elimination of part time, and for the reorganization of four schools in the districts of Brooklyn, Manhattan and the Bronx. The extension of the plan will reduce the number on part time from 150,000 to 50,000 children.

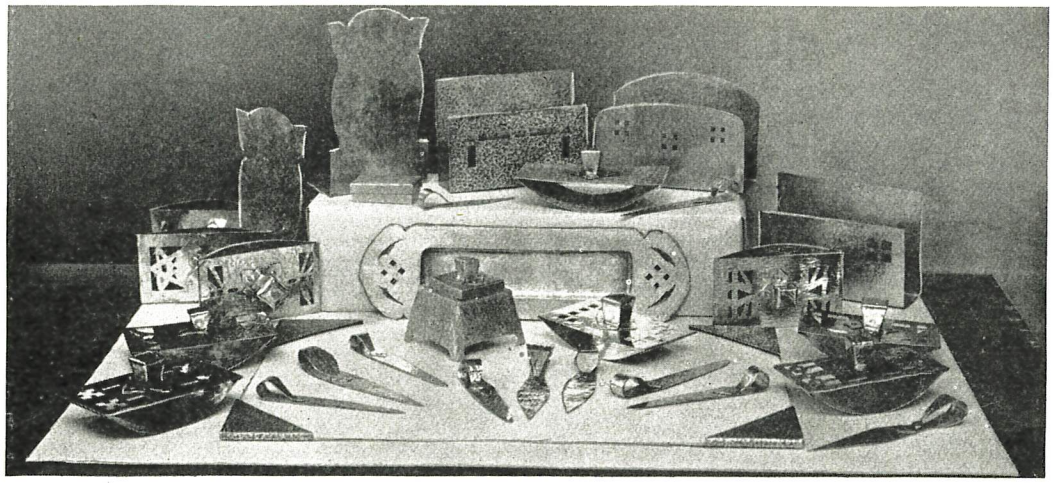
A report of the survey of the Boston schools conducted recently, contains no criticism of the vocational and industrial divisions of the system. The investigators had no cause for complaint against the quality of the instruction, the personnel of the teaching or supervisory corps, but their report recommends that authority be centralized and that the instruction be well distributed.

Regarding special activities, the experts declare they are well organized and administered, but the organization is not up to the standard to produce the highest degree of value. It is recommended that the fifteen departments now existing be rearranged under ten, to enable the general executive officer to supervise the work more thoroly.

The experts find the prevocational work handicapped because only two or three trades are taught in any one school. They recommend that a variety be taught so that pupils may try out several lines and find which is most suitable. The prevocational schools, as rapidly as posible, should become a part of the proposed Junior High School, with courses covering three years. Adolescent mental deficients should be in special prevocational classes and should be given practical work.

Quincy, Mass. A homemaking school has been opened with an enrollment of ninety persons. Miss Elizabeth Douglas has been appointed instructor. The school offers a two-year course and a diploma at the completion of the training.

Worcester, Mass. A summer course in homemaking has been opened as an annex to the Girls' Trade School. The



Desk Furnishings in Copper made by Grammar School boys in the special classes at the Rhode Island School of Design, Providence, R. I. The work was done under the direction of Normal Seniors.

course will be separate from the Trade School and classes will be limited to thirty students.

Dover, N. H. The domestic science class of the high school has undertaken the serving of lunches for the students. The food is prepared by the students and served at cost.

Ames, Ia. Beginning September first, the Iowa State College will offer a one-year course for telephone plantmen and a half-year course for automobile mechanics. The courses are to be limited to young men who are 17 years of age and who have completed the eighth grade of the elementary school.

Indianapolis, Ind. The Manual Training Department of the high school recently furnished a four-room workingman's cottage which had been loaned for exhibition purposes by the owner. The students selected $150 worth of furniture from local stores, basing their purchases on the size of the family and the wages of an average workingman.

Columbus, O. Classes in vocational training will be formed in the fall. It is planned to place the classes in charge of a special instructor.

Brooklyn, N. Y. Applications have been received from eligible candidates for licenses to teach in the elementary schools. The subjects which the successful applicants will teach are as follows:

Men—Agriculture, electric wiring and installation, designing of women's cloaks and suits, machineshop practice, modeling, plumbing, printing, pottery, sheetmetal work, sign painting, trade drawing and woodworking.

Women—Art weaving and design, bookbinding, dressmaking, millinery, novelty work and power machine operating.

Clinton, Ia. The boys of the Manual Training Department have begun the construction of outdoor furniture for summer use. Among the articles to be constructed are porch swings, flower boxes and flower stands.

Evansville, Ind. To instill in children a love for bird life, a competition in birdhouse building was recently arranged. Prizes of $2.50, $1.50 and $1.00 for the three best houses were awarded.

St. Paul, Minn. A summer school of manual training will be offered at the Central High School. The course will cover eight weeks and will be open to eighth-grade graduates and high school students.

Washington, D. C. Sixty girls, members of the graduating class of the National School of Domestic Arts, called on the President of the United States. The girls were attired in gowns and hats designed and made by themselves.

Mulberry, Kans. A complete manual training course will be offered in the high school in September.

Green Bay, Wis. The boys of the Manual Training Department of the East High School have built an addition to the poultry house. The work, which was under the direction of the teacher, constituted a special class problem in carpentry. At the West High School, the manual training classes have undertaken china painting. The students make their own designs, paint the china, and sell it to the citizens.

Minneapolis, Minn. A summer employment bureau has been established at the Rosedale School. The bureau will be in charge of a director, and will give aid in securing work and information concerning different lines of work.

NEW BOOKS AND PAMPHLETS

Business Employments.

By Frederick J. Allen. 218 pages. Price, $1.00. Ginn & Co., Boston.

In this book the author presents a large amount of authentic information about the business side of manufacturing, the business of trading, and the business of finance. The business side of manufacturing is treated with shoe-making as an example; modern retail trade is illustrated by the department store, and finance is illustrated by a study of banking institutions.

The purpose of the book is to provide information which will enable young people to choose intelligently between business and other pursuits, and to help make business employees more efficient, by giving the accumulated experience of the Boston Vocation Bureau. Numerous charts and diagrams are given to show the number of employees in each department and the chances of promotion.

Every school library and every person attempting to do vocational guidance work will want a copy of the book.

How to Write Business Letters.

Edited by Walter K. Smart. Cloth, 160 pages. Price, 70 cents, net. A. W. Shaw Co., New York, Chicago.

This brief, practical book is intended primarily for businessmen and is hardly suited to use in the high-school classroom. It should prove valuable to the teacher who desires to teach more than what is properly termed business English and who would give his students a glimpse of the underlying principles of business psychology as these are applied in the writing of sales, collection and miscellaneous letters. The book follows the laboratory method of analyzing typical examples of good and bad letters. Thruout it is informal and conversational in style.

The General Education Board—1902-1914.

254 pages. 32 full-page illustrations and 31 maps. General Education Board, New York.

This volume sets forth in detail the practical activities of the Rockefeller Education Board since the time of its foundation. The work of the Board in promoting agricultural education in the South thru direct aid to schools, and thru the development of farm demonstrations and boys' and girls' clubs, is particularly valuable.

Suggestive Courses in Mechanical Science. By Frank Henry Selden. Paper, 40 pages; price, 25 cents. The Maudslay Press, Valley City, N. D. This pamphlet offers an outline for teaching the author's textbooks in woodworking —the Mechanical Science System.

Plastic Flow. Scientific paper No. 278, Bureau of Standards, United States Department of Commerce, Washington, D. C. A valuable pamphlet giving the results of experiments on the capacity of clay used in making pottery, for being molded into desired shapes.

Part-Time, Co-operative and Continuation Classes in New York City. Reprint from the Seventeenth Annual Report of the New York City Schools. By Dr. John H. Haaren, Associate Superintendent, in charge. This is the first complete statement of three general types of industrial education which has made great progress in New York City.

Part-Time, Co-operative and Continuation Classes. Seventeenth Annual Report, Department of Education, New York City. The pamphlet gives valuable information relative to the conduct of part-time and continuation classes in New York. Some of the subjects touched upon are Basis of Organization, Working Staff, Selection of Pupils, Administrative Methods, Wages, Hours and Terms of Employment, Promotions, Practical Value of Work, Per Capita Cost of the Plan. There are a number of form blanks, graphs and tables.

Eastern Arts Association Proceedings. Published by the association, Fred P. Reagle, secretary, Montclair, N. J. This volume of proceedings covers the Buffalo meeting held in April, 1915.

Strength and Other Properties of Concretes as Affected by Materials and Methods of Preparation. Technologic Paper No. 58. United States Bureau of Standards, Washington, D. C.

This paper summarizes the results of twenty thousand tests on about three hundred aggregates consisting of limestone, granite, gravel and trap rock used for concrete materials in various sections of the country.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems and questions which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. If an answer is desired by mail, a stamped envelope should be enclosed. Address, Editors, Industrial-Arts Magazine, Milwaukee, Wis.

Staining Cedar Chests.

387. Q.—In staining cedar chests is there any way to make the white cedar to appear the cedar's natural reddish color?—*L. T.*

A.—I would say that it is in bad taste to endeavor to produce a uniform color tone on the finished chest. By staining the white portions, the true beauty of the natural cedar color is lost, since the white sap presents the natural background for the red of the heart wood and to my mind should not be changed. Should it be desired, however, to change the color, I would suggest that Bismark brown (water soluble aniline) be boiled in vinegar at the rate of two heaping tablespoons to the gallon. This solution can be sponged on the wood, covering the white portions first, and allowing to dry. Afterwards, cover the whole chest with a weak solution of the stain to even the color tone of the chest. Dry thoroly, give one coat of very thin white shellac, dry and sand with 00 sandpaper. Give two coats of Pratt & Lambert's No. 38 preservative varnish, allowing one week between coats. Four coats, of course, will give a better job. Rub the last coat with FF pumice stone and clean up with oil polish.—*Ralph G. Waring.*

Harness Making.

424. Q.—Do you know of any books devoted to harness repairing or harness making; also shoemaking?—*G. F. B.*

A.—*Harness Maker's Complete Guide,* $2.50, National Harness Review, Chicago; *Harness Shop Estimate Book,* $2.50, National Harness Review, Chicago; *Illustrated Guide for Harness Makers, Cutters and Apprentices,* $1, The Harness World, Cincinnati, O.; *Harness Making,* Paul Hasluck, Cassell & Co., New York; *Saddlery,* P. N. Hasluck, Cassell & Co., New York.

Shoe Making.

A Manual of Shoemaking and Leather Products, Dooley, $1.50, Little, Brown & Co., Boston; *Boots and Shoes and How to Make Them,* A. Earnshaw, Ward, Lock, Bowden Co., London; *Boot Making and Mending,* P. N. Hasluck, Cassell & Co., New York; *How to Repair Shoes,* West, Tuskegee Institute, Tuskegee, Ala.

Using Stain Pigments.

425. Q.—I am using prepared stains in the school shop here and I find that I have several empty cans containing a deposit of pigment at the bottom. How could I use this pigment in making new stains? I have been using three parts turpentine with one part boiled linseed oil. Will that give a good stain?—*S. M. B.*

A.—I would suggest that you obtain some 160° benzole, otherwise known as solvent naptha, scrape all your pigment as loose as possible, cover with the benzole and allow to stand until well softened. Reduce to the proper color by adding a little raw linseed oil, and some turpentine. Personally, I have very little use for pigment stains; they cloud the wood, do not properly bring out the figure, and because of the oil are very unstable. I have seen too many fine pieces of work ruined by these stains to have any use for them, except in a very few cases.—*Ralph G. Waring.*

Walnut Finish.

427. Q.—(a) Please describe the usual method of finishing walnut. (b) Are water stains advisable to use on birch to obtain the effect of mahogany?—*A. V. L.*

A.—(a) Walnut should be finished so as to bring out the natural dark, or fairly dark, warm, brown tones of the wood. Red should be avoided entirely. Stain the wood, sand with 00 sandpaper; give a very thin coat of shellac reduced one-half with alcohol and slightly colored with a spirit soluble brown aniline; sand very lightly with 00 sandpaper; fill with a Silex filler, as Bridgeport Standard, colored quite dark with Van Dyke brown; dry 48 hours; finish in four coats of Pratt & Lambert varnish No. 61; sand the first two coats lightly with 00; rub the last two with F or FF pumice stone and water. Clean up with a good oil polish. Allow each coat of varnish to dry at least one week.

Stain for walnut can be made as follows: Dissolve 1 oz. potassium permanganate and 1 oz. epsom salts in 1 gal. of water. Boil and apply hot. It is always a good practice to sponge the wood with clear water previous to staining, allowing it to dry, and then sanding smooth with 00 sandpaper.

(b) Water stains should be the only material used for this purpose on birch; the reason for this being the fact that birch has very powerful acids which will break down all oil stains, and spirit stains as well. Of the many commercial brands of oil stains which I have analyzed and tested I have found one which is fast to light.—*Ralph G. Waring.*

Graining and Inside Finishing.

436. Q.—Please advise me as to some text or book I can get which gives instructions on "graining" and inside finishing. I particularly want a book on graining.—*E. T.*

A.—*Graining—Ancient and Modern,* Wm. E. Wall, $3, Painters Magazine, New York; *Painter, Gilder and Varnisher,* W. T. Brannt, $1.50, H. C. Baird, Philadelphia; *Practical Graining and Marbling,* Paul Hasluck, $1, Periodical Publishing Co., Grand Rapids, Mich.; *The Painter's Encyclopedia,* F. B. Gardner, $2, Periodical Publishing Co., Grand Rapids, Mich.; *A Practical Manual of House Painting, Graining, Marbling and Sign Painting,* Ellis A. Davidson, $2, Periodical Publishing Co., Grand Rapids, Mich.; *The Practical Arts of Graining and Marbling,* James Petrie, $10, Painters Magazine, New York.

Upholstering.

437. Q.—Have failed to find a real practical book on upholstering. Do you know of any that would be sent on approval; one that describes present day methods, and uses American terms?—*A. W. H.*

A.—*Furniture Upholstering,* John N. Stephenson, $2, Clifford & Lawton, New York.

Uniforms for School Shops.

440. Q.—Please refer me to firms handling aprons suitable for manual training classes; also shop coats for instructors.—*J. M. A.*

A.—Everett Frain Company, Chicago; Orr & Lockett Hardware Co., Chicago.

Removing Varnish.

441. Q.—(a) What is the most practical method of removing old finish from furniture to be renovated by a vocational class?—*G. F. V.*

A.—(a) You have the choice of two methods: Use the Chadeloid Chemical Company's Chalco Varnish Remover. It has been judged in court of law that this brand is the only one which can be used without danger of prosecution by the patentees.

If this is a water clear remover, set the can in boiling water until thoroly heated, add ¼ lb. common paraffine, grated, for each gallon of remover. Shake well while the solution is cooling, in order to produce a thickened remover. This emulsion will act faster in removing the old varnish with very little loss from evaporation. Take an old stiff brush, fill it full of remover, and daub the work thoroly with remover. As soon as the old varnish begins to blister and wrinkle, use a putty knife to push the old varnish off in a long ribbon. A second application of remover may be necessary. On carved work, beads or fillets, use No. 3 steel wool. After the varnish is thoroly removed, a piece of

burlap well saturated with denatured alcohol should be used to finish the cleaning up process.

The second method consists in adding one pound of Babbit's or Lewis' potash or Red Seal lye to one gallon of boiling laundry starch. This is a very efficient remover and is quite cheap. The method to be followed is the same as for the patented remover. Clean up in water instead of alcohol.

Finishing Butternut Wood.

(b) What are the best finishes for butternut?

A.—(b) Use the same finish and formula as given in this issue for walnut.

(b) A natural finish is produced by first coating the work with raw linseed and turpentine, half and half, and allowing it to dry three days. Give one coat of white shellac, sand with 00 sandpaper, and two coats of flat varnish. The best finishers are the browns and they may be finished either in polished or dull varnish. For a high-class piece of work, such as a table, I would suggest the use of Pratt & Lambert's No. 61 varnish, the last coat to be polished. Allow at least one week between varnish coats.—*Ralph G. Waring.*

Lettering.

443. Q.—Can you inform me of any book dealing with all forms of lettering such as Roman, Architectural, Old English, etc.?—*C. D. C.*

A.—*Grammar of Lettering*, A. W. Lyons, $2.65, J. B. Lippincott, Philadelphia; *Letter and Letter Construction*, F. J. Tresize, $2, Inland Printer Co., Chicago; *Letters and Lettering*, F. C. Brown, $2, Bates & Guild, Boston; *Lettering*, Thos. W. Stephens, The Prang Co., New York; *Alphabets*, E. F. Strange, $1.60, Inland Printer, Chicago; *Modern Lettering*, Wm. Heyny, $2, W. T. Comstock Co., New York; *Freehand Lettering*, V. T. Wilson, John Wiley & Sons, New York.

Publishers.

444. Q.—Will you please send me the names of several firms which publish Mechanical Drawing books?—*H. E. M.*

The following firms publish books on Mechanical Drawing:

Taylor-Holden Company, Springfield, Mass.; John Wiley & Sons, Inc., 432 Fourth Ave., New York City; McGraw-Hill Book Co., 239 West 39th St., New York City; The Manual Arts Press, Peoria, Ill.; Scott, Foresman & Co., 623-633 South Wabash Ave., Chicago, Ill.; American Book Company, 330 East 22nd St., Chicago, Ill.; D. C. Heath & Co., 623-633 South Wabash Ave., Chicago, Ill.

Books on Boat Building.

To the Editors:

In regard to question No. 383 of the June issue. Several years ago when I was interested in model boats, I secured several good books on model sailing and motor boats from Spon & Chamberlin of New York City. These books were published in England.

May 25, 1916. *Francis B. Lincoln, Coudersport, Pa.*

NEWS NOTES.

The manual training and printing departments of the Winston-Salem High School will be open during the summer vacation for any boys who may desire to avail themselves of the opportunity for doing practical shop work. The manual training department will not only offer a regular course of instruction in woodworking, but will undertake to do general carpenters' work, furniture repairing, upholstering and picture framing. The printing department will offer, in addition to its usual course, practical work in job printing. Work for both departments will be accepted by the instructors so that the boys may have experience in doing jobs such as the men engaged in the regular woodworking and printing trades receive.

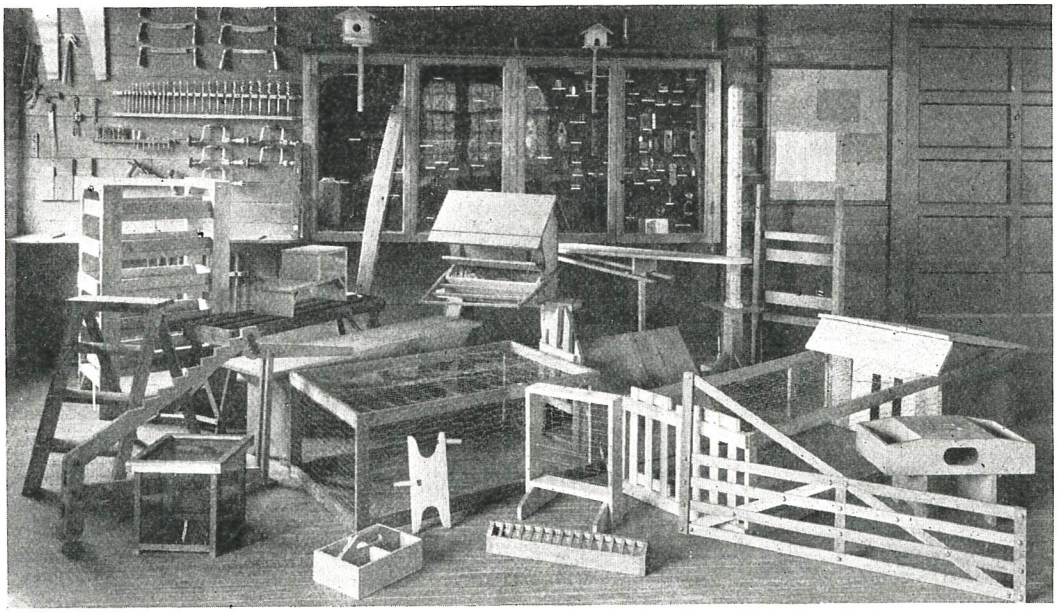
The Winona Technical Institute property at Indianapolis, which has been in litigation for several years, passes into the possession of the Indianapolis Board of Education according to a recent decision of the Indiana Supreme Court. The decision of the court will enable the board to proceed with the erection of buildings for a technical high school and trade school. Plans are already under way to erect a twelve-room addition to the buildings now on the property.

The teachers in continuation schools of the State of Wisconsin held their annual conference in Milwaukee on May 20th. Mr. Warren E. Hicks, state supervisor, presided and Mr. R. L. Cooley and others read papers.

A Conference of State Administrators of Vocational Education and Directors of Teacher Training Courses was held on Staten Island on May 5. The conference was conducted by officers of the National Society for the Promotion of Industrial Education.

The National Society for the Promotion of Industrial Education on May 20 and 21, conducted a conference of women engaged in vocational education.

A survey of industries is proposed in New York City by the Municipal Board of Estimate and Apportionment. The sum of $15,000 has been appropriated.



Farm Projects made by Students in the Milwaukee County School of Agriculture, Wauwatosa, Wis.
Mr. L. M. Roehl, Instructor.